ASM REVIEW OF METAL LITERATURE

1953

A. C. Forsyth
210 Met Lab.
U. of Ill.

Digitized by the Internet Archive
in 2023

https://archive.org/details/review-of-metal-literature_1953_10

TN
1
A58
Vol. 10
M/C

REVIEW OF METAL LITERATURE

An Annotated Survey of Articles and Technical Papers Appearing in the Engineering, Scientific and Industrial Journals and Books, Here and Abroad, Received in the Library of Battelle Memorial Institute, Columbus, Ohio.

Volume 10
1953

MARJORIE R. HYSLOP
Editor

STEWART J. STOCKETT
Technical Abstractor

Published by
AMERICAN SOCIETY FOR METALS
CLEVELAND 3, OHIO

Copyright, 1954

AMERICAN SOCIETY FOR METALS

Printed in U. S. A.

PREFACE

The A.S.M. Review of Metal Literature is a monthly feature of Metals Review, published by the American Society for Metals and distributed to its members. The present volume is a collection of the installments published in Metals Review from January through December 1953. It is the tenth volume in a series that began in 1944.

The annotations are not intended to serve as a substitute for a reading of the articles listed. They are brief abstracts designed to indicate the scope and content of the article so that the reader may determine whether it is something he wants to read in its entirety. In other words, they are indicative rather than informative abstracts.

The method of classifying the annotations into subject subdivisions is based upon the "ASM-SLA Metallurgical Literature Classification," designed by a joint committee of the American Society for Metals and the Special Libraries Association, and published by the American Society for Metals during 1950.

The table of contents lists the main headings into which the A.S.M. Review of Metal Literature is subdivided, together with secondary subdivisions indicating the scope of the main heading. The main sections are designated by capital letters, and individual annotations are identified by the appropriate capital letter preceded by a serial number. Each annotation in the text of the book is likewise followed by code symbols which refer to these main subdivisions, together with numerals which refer to subdivisions of the main classifications as listed in the table of contents. These numerals refer to the coding system used in the "ASM-SLA Metallurgical Literature Classification." For example, the symbol "C21" in parentheses at the end of an annotation indicates that the literature reference has to do with "Nonferrous Smelting and Refining" (C), and, specifically, "Smelting" (21).

The main divisions of the classification refer primarily to "processes and properties," with a final section "V" to include literature references dealing with specific materials and covering various processes and properties in a broad and general way. Materials are likewise coded by symbol at the end of each annotation. Chemical symbols of the elements are used to code metals and alloys. In addition, various materials groups are coded. For example, "EG" plus a lower-case letter refers to an "Element Group," "SG" to "Special Groups," and various combinations of capital letters indicate types of steels and cast irons. For example the symbol "C21" might be followed by the symbol "Cu," written "(C21, Cu)" and

indicating that the reference had to do with smelting of copper alloys. This coding system is explained in detail in the ASM-SLA Metallurgical Literature Classification.

An understanding of this coding system, however, is not essential to the use of this volume of the Review of Metal Literature, which is accompanied by a complete subject index starting on page 651. Since the annotations are classified primarily by processes and properties, the subject index has been prepared with the emphasis primarily on materials. Subheads and cross-references are included in sufficient detail to permit the location of articles on any specific subject related to the metal industry. Indexing is based on the content of the article and not merely on the title.

In using the book, if the primary interest is in the broad field of corrosion, or foundry practice, or heat treatment, turn immediately to the respective section as given in the table of contents. If the main interest is in aluminum alloys, or copper, or cast iron, turn to the corresponding heading in the subject index. If interest lies in specific aspects of foundry practices, or a particular type of heat treatment, these broad processes will be found broken down and subdivided in the subject index. An author index is also provided and a list of addresses of the journals and periodicals from which the literature references are taken.

Preparation of the annotations has been under the direction of Stewart J. Stockett, technical abstractor at Battelle Memorial Institute, assisted by a staff of abstractors, and various members of the translation group at Battelle. The subject index was prepared by Meredith S. Wright.

Marjorie R. Hyslop
Editor

April 1, 1954

TABLE OF CONTENTS

Section A. GENERAL METALLURGICAL 1

History (2); Education (3); Statistics and economics (4); Plant practice (5); Industrial relations (6); Health and safety (7); Secondary metals, scrap and waste disposal (8); Research organizations (9); Glossaries, definitions, trade names and directories (10).*

Section B. RAW MATERIALS AND ORE PREPARATION 22

Ore deposits and raw material reserves (10); Sampling (11); Mining (12); Crushing, grinding and sizing (13); Concentration and beneficiation (14); Roasting and calcining (15); Sintering and nodulizing (16); Briquetting (17); Fuels technology (18); Refractories technology (19); Fluxes and slags (21); Addition agents (22).

Section C. NONFERROUS EXTRACTION AND REFINING 39

Smelting (21); Distillation (22); Electrolytic processes (23); Cyanidation (24); Vacuum refining (25); Reduction by metals (26); Cementation (27); Separation of metals (28); Amalgamation (29); Carbonyl reduction (1); Hydride decomposition (2); Halide decomposition (4); Ingot casting (5).

Section D. FERROUS REDUCTION AND REFINING 52

Blast furnace (1); Openhearth (2); Bessemer (3); Electric arc (5); Electric induction (6); Duplexing, triplexing, multiplexing (7); Other processes—crucible, wrought iron, etc. (8); Ingot casting (9).

Section E. FOUNDRY 80

Melting techniques—cupola and other foundry methods (10); Sand casting (11); Permanent mold casting (12); Die casting (13); Centrifugal casting (14); Precision investment casting (15); Other methods (16); Patterns (17); Sand technology (18); Molding (19); Coremaking (21); Rigging (22); Pouring (23); Shakeout and trimming (24); Metallurgical control—solidification phenomena, fluidity, structure control (25).

* See preface for significance of numerals.

Section F. PRIMARY MECHANICAL WORKING 121

Preparation for working—stripping, heating, scalping (21); Forging (22); Rolling (23); Extrusion (24); Swaging (25); Tube-making (26); Drawing of rod (27); Wire drawing (28); Finishing operations (29); Lubricants (1).

Section G. SECONDARY MECHANICAL WORKING 139

Press work in general (1); Blanking and punching (2); Stamping (3); Drawing (4); Impact extrusion (5); Bending (6); Rubber pad forming (8); Stretch forming (9); Heading (10); Roll forming (11); Thread rolling (12); Spinning (13); Bulging (14); Shearing and trimming (15); Die sinking (16); Machining and machinability (17); Grinding (18); Honing, lapping and superfinishing (19); Cutting fluids and drawing compounds (21); Flame and arc cutting (22); Prestressing and shot peening (23).

Section H. POWDER METALLURGY 165

Powder production (10); Powder properties (11); Mixing or blending (12); Lubricants (13); Molding or compacting (14); Sintering (15); Post-sintering operations (16).

Section J. HEAT TREATMENT 175

Homogenization (21); Austenitizing (22); Annealing and malleablizing (23); Normalizing (24); Patenting (25); Quench hardening (26); Precipitation hardening (27); Case hardening (28); Tempering (29); Stress-relief (1); Heating and cooling media—induction heat, flame heat treatment, salt and lead baths, controlled atmospheres, quenching media (2).

Section K. JOINING 193

Arc welding (1); Gas welding (2); Resistance welding (3); Thermit welding (4); Forge welding (5); Other welding processes (6); Soldering (7); Brazing (8); Weldability and weld tests (9); Bonding metals to nonmetals (11); Adhesive joining (12); Mechanical fastening (13).

Section L. CLEANING, COATING AND FINISHING 239

Mechanical cleaning and polishing (10); Chemical cleaning and polishing (12); Electrochemical cleaning and polishing (13); Chemical coatings—oxide, phosphate, chromate (14); Diffusion coatings (15); Dip coatings (16); Electroplating (17); Electroforming (18); Anodizing (19); Cathodic oxide coatings (21); Cladding (22); Metal spraying (23); Weld-deposited coatings (24); Vapor-deposited coatings (25); Paint and organic coatings (26); Ceramic coatings (27).

Section M. METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURE 287

Microscopy (21); Diffraction methods (22); Other techniques (23); Phase diagrams (24); Nuclear and atomic structures (25); Crystal structure (26); Microstructure (27); Macrostructure (28).

Section N. TRANSFORMATIONS AND RESULTING STRUCTURES 320

Diffusion (1); Nucleation (2); Grain growth (3); Recovery (4); Recrystallization (5); Allotropic transformations (6); Precipitation (7); Austenite decomposition (8); Other eutectoid reactions (9); Superlattice formation (10); Other reactions in the solid state (11); Liquid-solid reactions (12); Liquid phase reactions (14); Vapor-solid reactions (15); Vapor-liquid reactions (16).

Section P. PHYSICAL PROPERTIES AND TEST METHODS 346

Mass (10); Thermal (11); Thermodynamic (12); Chemical (13); Electrical (15); Magnetic (16); Optical (17).

Section Q. MECHANICAL PROPERTIES AND TESTS; DEFORMATION . 386

Elastic properties (21); Anelasticity (22); Plastic properties (23); Plastic deformation (24); Stresses (25); Fracture (26); Tension (27); Compression (28); Hardness (29); Torsion (1); Shear (2); Creep (3); Stress-rupture (4); Bend (5); Impact (6); Fatigue (7); Damping (8); Wear and friction (9).

Section R. CORROSION 470

Mechanism of corrosion—galvanic, concentration cell, erosion-corrosion, stress-corrosion, corrosion fatigue, etc. (1); Corrosive effects—general dissolution, intergranular, pitting, cavitation, scaling and tarnishing, etc. (2); Atmospheric corrosion (3); Waters (4); Aqueous solutions (5); Concentrated inorganic chemicals (6); Organic chemicals (7); Soils (8); Gases (9); Preventive measures (10); Tests (11).

Section S. INSPECTION AND CONTROL 506

Sorting and identification (10); Composition analysis (11); Statistical control (12); Flaw detection (13); Size measurement (14); Surface roughness (15); Temperature measurement and control (16); Process control (18); Radiation detection and radioactive tracers (19); Miscellaneous service failures (21); Standards and specifications (22).

Section T. APPLICATIONS OF METALS IN EQUIPMENT 534

Automotive (21); Marine (22); Railroads (23); Aircraft (24); Mining and oil field equipment (28); Chemical equipment (29); Electrical and electronic equipment (1); Armor and ordnance (2); Agricultural equipment (3); Civil engineering equipment (4); Metallurgical equipment (5); Small tools, cutlery and hardware (6); Machine parts (7); Instruments (8); Fine arts (9); Miscellaneous consumer products (10).

Section V. MATERIALS 556

This section is reserved for literature references dealing with specific materials, and covering various processes and properties in a broad and general way.

ADDRESSES OF PUBLICATIONS 565

AUTHOR INDEX 585

SUBJECT INDEX 651

SECTION A

GENERAL METALLURGICAL

1-A. Practical Methods for In-Plant Reduction of Metal Finishing Wastes. W. L. Pinner. *Sewage and Industrial Wastes,* v. 24, Nov. 1952, p. 1432-1435.
General discussion. (A8, L general)

2-A. Timken-Detroit's New Axle and Gear Plant. Joseph Geschelin. *Automotive Industries,* v. 107, Nov. 15, 1952, p. 50-53, 94.
Production facilities at the Ohio Axle and Gear Division of the Timken-Detroit Axle Co., Newark, Ohio, including material handling, welding, heat treating, machining, and grinding. (A5, G general, ST)

3-A. Ion-Exchange Resins for Metal Recovery. A. G. Thomson. *Mining Journal,* v. 239, Nov. 14, 1952, p. 545.
A method of gold recovery which utilizes ion-exchange resins and eliminates zinc precipitation. (A8, Au)

4-A. (French.) **Perspectives of the Japanese Aluminum Industry.** G. A. Boudart. *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 335-337.
Figures on production and fabrication of Al in Japan and on influence on world trade. (A4, Al)

5-A. Some Experiences With Air Pollution Abatement in the Steel Industry. C. A. Bishop. *Blast Furnace and Steel Plant,* v. 40, Dec. 1952, p. 1448-1453.
Experiences with openhearths, bessemers, and blast furnaces. Cleaning of ferromanganese blast furnace gas. (A7, D general)

6-A. Triple-Threat Fume Disposal System. *Chemical Engineering,* v. 59, Dec. 1952, p. 262-263.
Tells how new installation at Kaiser Aluminum and Chemical Corp.'s Mead, Wash., plant prevents air pollution, improves working conditions, and recovers 35 tons per day of valuable dust. (A7, A8, C23, Al)

7-A. The Trostre Tin-Plate Works of the Steel Company of Wales. *Engineering,* v. 174, Nov. 21, 1952, p. 649-652.
Detailed information on various installations with special reference to the electrical equipment. (A5, F23, L17, CN, Sn)

8-A. Distribution of Tungsten and Moybdenum for the Fourth Quarter, 1952. *South African Mining and Engineering Journal,* v. 62, Oct. 18, 1952, p. 255, 257.
Statistical data. (A4, W, Mo)

9-A. Metal Processing at M.I.T. Howard F. Taylor. *Technology Review,* v. 55, Dec. 1952, p. 97-100, 124, 126.
Teaching and research activities of Metal Processing Division of Department of Metallurgy at MIT, and important part played therein by new Metals Processing Laboratory. (A9, A2)

10-A. Metals Processing Laboratory. *Technology Review,* v. 55, Dec. 1952, p. 89-92, 120, 122.
The facilities at MIT provided by Alfred P. Sloan Foundation, Inc. The new laboratory is intended to make a scientific approach to basic metal processing. (A9)

11-A. (Pamphlet.) **Saving Scarce Materials.** Nov. 1952. 28 pages. Anglo-American Council on Productivity, 2 Park Ave., New York 16, N. Y.; or 21 Tothill St., London, S.W.1, England.
Deals with ferrous and nonferrous metals in general and detailed discussion of material by material. Methods of conservation, labor aspect, and the long-term problem. (A general, Fe, SG-a)

12-A. Gold Recovery From Cyanide Solutions. New CRL Ion-Exchange Method Promising. *Chemical Age,* v. 67, Dec. 6, 1952, p. 771.
Principles and operation of ion exchange method for gold recovery. (A8, C24, Au)

13-A. Chromium Stainless Steels. *Sheet Metal Industries,* v. 29, Dec.

1952, p. 1089-1091, 1094.
Questions and answers on problems associated with industrial use of Cr stainless.
(A general, T general, SS)

14-A. The Metallurgist and Metal Supply. James Boyd. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 82-90.
Reserves of metals for the free world and the ways metallurgists can improve the situation. (A4)

15-A. Metals for Defense in the ECA Countries. Pierre van der Rest. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 91-99.
Potential contributions to defense of the free world. (A4)

16-A. Metals for Defense in the Free World. Clyde Williams. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 100-112.
Data on production of metals in the Free World. Includes tabulations. (A4)

17-A. Metals Conservation and Substitution for Defense. K. P. Harten. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 113-123.
Ways to conserve and extend metal supplies of the Free World. Cooperation by the various countries in developing and adopting replacements and in preventing waste. (A4)

18-A. Mineral and Metal Industries of India. Dara P. Antia. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 166-169.
India's mineral and metal production, imports, exports, metal needs, and factors affecting future development of her metal industries. (A4, B10)

19-A. Metallurgical Education, Research and Development Work in Norway. A. B. Winterbottom. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 294-297.
Aims and facilities. (A3, A9)

20-A. The New Metals Age. Lawrence P. Lessing. *Fortune,* v. 47, Jan. 1953, p. 109-115, 152, 154, 156-158, 160.
Development of metals industries from 16th century, including basic metals, chemical revolution in metals, alloys, light metals, alloy steels, rare metals, and refractory metals. Metals and alloys are tabulated in respect to physical properties and uses. Color photographs. (A2)

21-A. Metals and Materials, Review and Forecast. *Iron Age,* v. 171, Jan. 1, 1953, p. 278-285.
Economics of iron ore, refractories, and various nonferrous metals. 25 ref. (A4)

22-A. Production Processes, Review and Forecast. *Iron Age,* v. 171, Jan. 1, 1953, p. 286-305.
Latest advances in those processes that represent the heart of American industry. Among the 13 processes studied are: automation, casting, extrusion, forging, heat treating, machining, and metal finishing. Tables and diagrams. 76 ref. (A general)

23-A. Tool Steel Directory. *Iron Age,* v. 171, Jan. 1, 1953, p. 306-309, 311-312, 314-316, 318-320, 323-324, 326, 328, 330, 332-338, 342-344, 346-355, 358-368, 370-372, 375-382, 385-391.
Charts showing composition and mechanical properties, and forging and heat treating temperatures for most tool steels in U. S. and Canadian markets, plus a list of tool steel brands together with addresses of producers and distributors. (A10, TS, C-n)

24-A. *The Iron Age* 1953 Metal Industry Facts. *Iron Age,* v. 171, Jan. 1, 1953, p. 393-488.
Indexed, cross-indexed, reference section of statistical data on the following: steel industry, nonferrous metals, raw materials, metal products, casting and forging, machinery, market information, and labor. (A4)

25-A. Directory of Carbides. *Iron Age,* v. 171, Jan. 8, 1953, p. 109-110, 121-122.
Supplement to directory listings in Jan. 1, 1953 issue. Individual brands. (A10, C-n)

26-A. Yugoslavia's Mineral Wealth —Largest Producer of Non-Ferrous Ores in Western Europe. *Metal Age,* Dec. 1952, p. 3-7, 14.
Economic survey. Tables. (A4, B10, EG-a)

27-A. Treatment of Metal Finishing Wastes. Allen G. Gray. *Metal Progress,* v. 62, Dec. 1952, p. 77-81.
Treatment of cyanide waste, treatment of sludge, and treatment of Cr wastes with SO_2. Flow diagrams. (A8, L general)

28-A. Metal Recovery by Ion Exchange. C. F. Paulson. *Plating,* v. 39, Dec. 1952, p. 1330-1334, 1338.
Feasibility of recovering metals from chemical solutions in manufacturing and plating processes. Tables. 8 ref. (A8, L17, EG-a)

29-A. 1953 Metalworking Facts and Figures. *Steel,* v. 132, Jan. 5, 1953, p. 155-202.

Statistics published a year ago are continued and brought up to date. Raw materials through to end products of the metal consuming industries are covered, plus related subjects such as labor, prices, and earnings. Graphs and tables. (A4)

30-A. 1953 Forum on Technical Progress in Metalworking. *Steel,* v. 132, Jan. 5, 1953, p. 205-240, 242-244, 246, 249, 252, 254, 256-258, 260, 262, 264-266, 269-270, 272, 277-278, 280-282, 284, 286, 289, 292, 294, 296, 298-300, 303, 306, 308, 311-312, 314, 316-318, 320, 323, 326, 329, 332, 334, 336-338, 342, 345-347, 350, 353-354, 357, 360, 363, 366, 368-370, 372, 374, 376, 379, 382, 384, 386-387, 390, 392, 394, 397, 400, 402, 404, 406-407, 410, 413-414, 417, 420-422, 424, 426-429, 432, 434, 436, 438-440, 442-444, 447-448, 450-451, 454, 456, 458, 460.

Consists of articles on the following: steelmaking, nonferrous metal production, casting, materials and metallurgy, heat treating, inspection and testing, drives and controls, machining and tooling, forming, cleaning and finishing, joining and assembling, handling and packaging, lubrication, servicing and maintenance. (A general)

31-A. Recent Experiments in the Recovery of Manganese. Shadburn Marshall. "Yearbook of American Iron and Steel Institute", 1953, p. 289-306, disc., p. 306-307.

Experimental work done within last two years with AISI assistance and sponsorship has demonstrated that at least three processes for recovery of manganese from open-hearth slags are technically feasible. U. S. Bureau of Mines pyrometallurgical process, U.S.B.M. ammonium carbonate leaching process, and Mn recovery from slags by chloridization. Equipment is diagrammed and illustrated; data are charted and tabulated. (A8, D2, Mn)

32-A. (Russian.) **Problems of Replacing Nonferrous Metals and Alloy Steels.** B. Surikov. *Za Ekonomiiu Materialov,* Aug. 1952, p. 37-43.

Use of wood and plastics for bearings and other machine parts; use of less critical metals to save Sn, particularly for bearings; savings of Mo, Ni, Co in high-alloy steels by using lower alloy grades and surface hardening, and possibilities of Ti and Ti alloys which are in the laboratory stage. (A general)

33-A. (Russian.) **Improving the Utilization of Alloy Steels.** M. Begidzhanov. *Za Ekonomiiu Materialov,* Aug. 1952, p. 86-88.

Amounts of stainless and other high-alloy steels saved in various factories by using substitutes and improved manufacturing techniques. (A general, SS, AY)

34-A. (German.) **Future Problems of German Metal Supply.** Ferdinand Friedensburg. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Nov. 1952, p. 425-431.

Data on production and consumption in Germany. (A4)

35-A. (Book.) **Metallurgy for Engineers.** G. K. Ogale. 252 pages. 1952. United Book Corp., Poona, India. 10 rupees, 8 annas.

Textbook primarily intended for Indian metallurgical students. Stresses metallurgical developments in India. (A general)

36-A. (Book.) **Proceedings of the First World Metallurgical Congress.** William Marsh Baldwin, Jr., editor. 835 pages. 1952. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $10.00.

Covers Congress held in 1951. Includes 165 pages of nontechnical and semitechnical material (four articles of economic interest abstracted separately), an 84-page directory, and 51 technical papers under the broad headings of: mining, melting, and refining; fabrication, development, and application of metals; mechanical metallurgy; surface metallurgy; and physical metallurgy. Of the latter, eight were previously abstracted from versions published in *Metal Progress* during 1951. The others are abstracted separately in this issue. (A general)

37-A. (Book.) **The Statistical Yearbook, 1952. Tin; Tinplate; Canning.** 268 pages. 1952. International Tin Study Group, The Hague, Netherlands. $5.60.

Contains series of articles covering events of recent years in tin and tinplate industries and statistical account of tin, tinplate, and canning situation in 110 countries. (A4, Sn)

38-A. (Book.) **The Story of Mond Nickel.** A. C. Sturney. 63 pages. Mond Nickel Co. Sunderland House, Curzon St., London W.1, England.

Development of Mond Nickel Co.; includes sketches of past leaders. (A5, A2, Ni)

39-A. (Book.) **Yearbook of American Iron and Steel Institute.** 426 pages. 1952. The Institute, 350 5th Ave., New York 1, N. Y.

Covers 60th General Meeting, New York, May 1952. Lists officers and directors, program and proceedings, including talks on economic trends, government regulations, industrial relations, etc. Technical sessions on

processing, research, and open-hearths. Of the eight technical papers, and one economic paper, seven were previously abstracted from other sources. Abstracts of the other two appear in this issue.
(A4, A6, D general, Fe, ST)

40-A. Developments in the Iron and Steel Industry During 1952. I. E. Madsen. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 123-161.

General discussion which includes foreign plants, raw materials, blast furnaces, steelmaking, rolling mills, finishing, furnaces and controls, materials handling, and power. Photographs, diagrams, and tables.
(A general, CI, ST)

41-A. Early History of Titanium. M. A. Hunter. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 130-132.

Reviews laboratory interest during 1906-1908 for producing Ti in pure and usable form. (A2, Ti)

42-A. The Free World's Metal Resources and Expected Demand. Alfred J. Murphy. *Metal Progress,* v. 63, Jan. 1953, p. 68-73, 172, 174, 176.

Principles which affect the availability of metals and influence commercial utilization efficiency. Production and consumption statistics; mineral reserves. Tables.
(A4, Fe, ST, EG-a)

43-A. Resurrection of Metallurgy in Italy. Antonio Scortecci. *Metal Progress,* v. 63, Jan. 1953, p. 89-93, 176, 178.

Briefly sketches prewar situation as an introduction to postwar recovery. Iron ore reserves, nonferrous statistics, iron and steel foundries, applied research. Tables and graphs. (A general)

44-A. Advances in Nonferrous Metals in Great Britain Since 1945. L. G. Beresford. *Metal Progress,* v. 63, Jan. 1953, p. 103-108.

Postwar techniques of deep drawing, rolling, extrusion, die casting, cold welding, soldering by ultrasonics, and metal finishing.
(A general, EG-a)

45-A. Metallurgical Research in the Netherlands. J. D. Fast. *Metal Progress,* v. 63, Jan. 1953, p. 109-111.

Research on metal fabrication techniques and utility of metals and alloys. Studies of metallic conductivity of heat and electricity. Deep drawing, permanent magnets, gases and metals, hardening by internal oxidation, welding research.
(A9)

46-A. Metal Industry in Japan. *Metal Progress,* v. 63, Jan. 1953, p. 112-114, 178-179.

Postwar problems of iron and steel industry. Mineral resources of Japan are emphasized.
(A general, B10, ST)

47-A. A Combined Water Softening and Plating Waste Treatment Plant Operation. I. D. Cox. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 18-23.

Advantages of combining the two plants; Cr waste treatment, waste steel pickling liquor treatment, Na metabisulfite treatment, SO_2 treatment, and cyanide treatment.
(A8, L17, Cr, ST)

48-A. A Continuous Method for Treatment of Cyanide Wastes. D. C. Carmichael. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 167-180.

Three methods of disposal, particularly the alkaline chlorination method. Diagrams and tables. (A8)

49-A. Chromate Recovery by Ion Exchange. C. F. Paulson. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 209-217.

Some of the theoretical aspects of treatment of chromic acid solutions by ion exchange for recovery of chromic acid at lowest cost with advantages of water reclamation, elimination of water pollution, increased electrical efficiency, better rinsing, and lowered space requirements. Tables and diagrams. (A8)

50-A. Anodizing Solution Regeneration by Ion Exchange. Durward T. Armstrong. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 218-220.

Shows that chromic acid disposal problem can be handled economically through use of ion exchangers.
(A8, L19)

51-A. The Application of Ion Exchange Resins to Metallurgical Waste Problems. F. X. McGarvey. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 289-304.

Theory of operation and examples of use including Cu and brass pickle rinses; Zn recovery; Cr and chromates; cyanide concentration; and Ni, Pb, V, W, and Sn. Purification and regeneration of potential waste solutions. Tables. 15 ref.
(A8, Cu, Zn, Cr)

52-A. Combating Oil and Metal Plating Waste Problems at Kelly Air Force Base. F. A. Sanders. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 382-394.

Removing emulsified oils; floating oils and solvents; chromic acid; relatively small amounts of acids containing Ag, Cu, Sn, Cd, brass, and Pb; and cyanides. Diagrams and tables.
(A8, L12, Ag, Cu, Sn, Cd, Pb)

53-A. Use of Commercial Hypochlorine Solution as a Treatment Agent for Cyanide. Earl J. Roy. *Pro-*

ceedings of the Seventh Industrial Waste Conference, Nov. 1952, p. 419-428.

Gaseous chlorination, Na hypochlorite treatment process, problems of treatment, and continuous hypochlorination. (A8)

54-A. Metal Finishing Industry Action Committee of the Ohio River Valley Waste Sanitation Commission. W. L. Pinner. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 429-438.

General discussion. (A8)

55-A. Recovery of Chromate and Nickel-Ions From Rinse Waters by Ion Exchange. A. C. Reents and D. M. Stromquist. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 462-480.

Equipment for recovery. Tables and diagrams. 8 ref. (A8, L12, Cr, Ni)

56-A. Progress Report of American Electroplaters Society Research Projects on Plating Room Waste in Three Parts. I. The A. E. S. Research Program. W. L. Pinner. **Part II. Determination of Impurities in Plating Wastes and Plating Baths.** Earl J. Serfass. **Disposal of Cyanide Waters From Plating Rooms.** Walter Zarban, Barnett F. Dodge, and Charles A. Walker. *Proceedings of the Seventh Industrial Waste Conference,* Nov. 1952, p. 518-540.

Includes tables, graphs, and diagrams. 12 ref. (A8, L17)

57-A. Ferrous Metals and World Markets. Review of Last Year's Trends. *Foundry Trade Journal,* v. 94, Jan. 22, 1953, p. 109-111.

Production, rationed steel, raw materials, iron ore, new sources of supply, imports, exports, price movements, and fight for markets. (A4, Fe)

58-A. (Book.) **Automation. The Advent of the Automatic Factory.** John Diebold. 181 pages. D. Van Nostrand Co., 250 4th Ave., New York 3, N. Y. $3.00.

Possibilities, limitations, social, and economic consequences of revolutionary new machines of electronic age. Includes meanings in terms of jobs, cost of goods and services, standards of living, and increased leisure time. (A5, A6)

59-A. (Book.) **Disposal of Spent Sulfate Pickling Solutions.** Richard Hoak. 76 pages. Nov. 7, 1952. Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio. $2.00.

Neutralization procedures, methods for recovery of various by-products, and appendices on analytical methods and determination of basicity factors. (A8, L12)

60-A. (Book.) **Metal Industry Handbook and Directory.** 448 pages. 1952. Louis Cassier Co., Ltd., Dorset House, Stamford St., London S.E.1, England. $7.44.

Revised work is recognized source of information and data for those engaged in production and uses of nonferrous metals. (A10, EG-a)

61-A. (Book.) **Metallurgy.** Edwin Gregory. 284 pages. 1952. Blackie & Son, Ltd., 66 Chandos Pl., London W.C.2, England. 25s.

Introduction to study of metallurgy, both ferrous and nonferrous, useful not only to engineers, for whom book is primarily intended, but to laymen as well. (A general)

62-A. (Book.) **Nonferrous Physical Metallurgy.** Robert J. Raudebaugh. 345 pages. 1952. Pitman Publishing Corp., 2 West 45th St., New York 19, N. Y.

Recent developments in processing, fabrication and application of Al, Mg, Cu, Ni, Cd, Pb, Sn, and Zn and their alloys. Separate chapters on each metal or group of metals, with final chapter on application of powder metallurgy to production of parts. (A general, EG-a)

63-A. (Book.) **The Principles of Physical Metallurgy. Ed. 3.** Gilbert E. Doan. 331 pages. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $5.50

Describes behavior of metals under influence of operations performed upon them in metalworking. Subject of physical metallurgy is approached from standpoint of classical physical chemistry and physics. Properties are explained in terms of atoms and electrons. Material on mechanisms of deformation and annealing was revised and new casting methods were added, including investment and directional solidification methods for sand castings. Revisions include explanation of physical properties of metals in terms of electrons and atoms. (A general)

64-A. (Book.) **Standard Metal Directory. Ed. 13.** 927 pages. Atlas Publishing Co., 425 W. 25th St., New York, N. Y. $15.00.

Directory is divided into four sections: iron and steel plants; ferrous and nonferrous metal foundries; metal rolling mills; and smelters of nonferrous metals. (A10, Fe, ST, EG-a)

65-A. (Book.) **Textbook of Engineering Materials.** Melvin Nord. John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. $6.50.

An introduction to those primary engineering concepts which the student will find amplified in all further engineering courses. First half of book is general treatment of subject; second half treats specific materials including 111 pages on metals. (A general)

66-A. Metals in Review. *Engineering and Mining Journal,* v. 154, Feb. 1953, p. 72-99, 123.

Includes: "Gold", M. A. Kriz; "Silver", H. M. Bratter; "Copper", H. H. Wanders; "Lead", R. L. Ziegfeld; "Zinc", C. R. Ince; "Tin", W. P. Shea; "Magnesium", J. D. Hanawalt; "Aluminum", G. P. Lutjen; "Uranium", B. Meyers; "Minor Metals", C. W. Merrill; and "Ferro-Alloy Metals", N. B. Melcher. (A general)

67-A. Supply of Alloying Metals Still Acute. Copper Also Remains Critical. Henry H. Fowler. *Industrial Gas,* v. 31, Feb. 1953, p. 6-7.

Present status of availability of alloying metals. Graphs. (A4)

68-A. Europeans Refine Aluminum Scrap by Alloying. Hirsch Loevenstein. *Light Metal Age,* Feb. 1953, p. 18-20.

Shows that Zn can be used economically and with many advantages to refine Al scrap. Tables. (A8, Al, Zn)

69-A. Industry's Responsibility to Youth. John S. Bugas. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 1-5.

Presents, in a general way, industry's part in American life. (A6)

70-A. Responsibility of Top Management in Training. J. D. Judge. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 274-278.

Some reasons prompting initiation of a business; defines top management; organizational make-up of business; objectives and reason for training; and responsibilities of top management in training. (A6, A3)

71-A. Single Objective Safety. Dan Farrell. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 282-286; disc., p. 286.

Situations in which accidents can and do occur in foundry. Possible solutions. (A7, E general)

72-A. Apprentice Training. It Is Needed. Maurice C. Sandes. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 317-320; disc., 320-321.

Need for additional apprentice training in the foundry and obstacles to be overcome. (A3, E general)

73-A. Melt Department Incentive Plan. Erwin G. Tetzlaff. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 432-435; disc., p. 435-438.

Statistical approach. Tables. (A6, E general)

74-A. The Foundryman Looks at Air Pollution. N. H. Keyser and H. P. Munger. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 364-370; disc., p. 370.

Problem, source of contaminants, methods for control, and cost involved. 15 ref. (A7, E general)

75-A. How to Maintain Foundry Ventilation and Dust Collecting Systems. Kenneth M. Smith. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 485-496.

A well-planned and operated preventive maintenance program for foundry ventilation and dust collecting equipment will permit full use of production equipment, and will provide cleaner and more comfortable working conditions in foundry. Diagrams. (A7, E general)

76-A. Applied Waste Control Principles. John R. Walley. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 578-580; disc., p. 580.

General article which points out how to approach problems of waste and control. (A8)

77-A. Pricing Castings Using Standard Costs. Jeff A. Westover. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 756-764; disc., 764-765.

Essentials of suitable pricing methods; figure build-up sheet, and overhead cost build-up sheet. (A4, E general)

78-A. (French.) **Belgian Center for Study of Corrosion.** Marcel Pourbaix. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 198-203.

Activities of a research, technical, and educational institute. (A9, R11)

79-A. Outlook for Copper, Lead, and Zinc in 1953. William F. Boericke. *Analysts Journal,* v. 9, Feb. 1953, p. 21-23.

(A4, Cu, Pb, Zn)

80-A. Metal Conservation in Britain. *Metal Progress,* v. 63, Jan. 1953, p. 226, 228, 230. (Digest of "Report of the Metals Economy Advisory Committee" to the British Minstry of Supply, Sept. 11, 1952. H. M. Stationery Office, London, England.) (A4)

81-A. Mineral Economics. J. D. Ridge. *Mineral Industries,* v. 22, Feb. 1953, p. 5-7.

Brief analysis of future prospects of Al and Cu. Graphs. (A4, Cu, Al)

82-A. International Cooperation in Metallurgical Literature Classification. Marjorie R. Hyslop. *American*

Documentation, v. 4, Jan. 1953, p. 1-3.
Development of the ASM-SLA classification and problems encountered in its extension. (A10, U8)

83-A. Application of Standard Business Machine Punched-Card Equipment to Metallurgical Literature References. Alvin T. Maierson and W. W. Howell. *American Documentation,* v. 4, Jan. 1953, p. 3-13.
Shows that an information service for metallurgy can be set up by using standard equipment and ASM-SLA coding system. (A9, U8)

84-A. Tin in the American Economy. Bruce W. Gonser. *Battelle Technical Review,* v. 2, Mar. 1953, p. 31-32.
Importance in our economy, Sn-plating developments, and uncertainty of supply. (A4, Sn)

85-A. Aluminum Industry Expands for War and Peace. Samuel W. Anderson. *Journal of Metals,* v. 5, Mar. 1953, p. 388-394.
Future prospects with respect to ores, available power, potential uses, substitutes, and stockpiling. Graphs and photographs. (A4, Al)

86-A. Automatic Zinc Sampler Saves Handling Time. Fred J. Meek. *Journal of Metals,* v. 5, Mar. 1953, p. 404.
Savings resulting from use of fork lift trucks and automatic sampler in handling metal from furnaces to railroad cars. (A5, Zn)

87-A. Aluminium Development in Relation to Supply. E. G. West. *Metallurgia,* v. 47, Feb. 1953, p. 63-69.
General discussion of the future trends in economic supplies. Photographs. (A4, Al)

88-A. Spontaneous Combustion of Metal Powders. Bernard Kopelman and Vera B. Compton. *Metal Progress,* v. 63, Feb. 1953, p. 77-79.
Characteristics of pyrophoricity, procedure for handling metal powders, and uses. (A7, H general)

89-A. Securing a Competitive Position by Sound Engineering and Modern Equipment. W. W. Sieg. *Metal Progress,* v. 63, Feb. 1953, p. 80-82.
Importance of metallurgy to the general public. Example from operations in brass mill. (A6, F23, Cu)

90-A. Control and Disposal of Swarf and Waste Metal. *Pera Bulletin,* v. 6, Feb. 1953, p. 67-71.
Methods for disposing of ferrous and nonferrous turnings. 25 ref. (A8)

91-A. (Book.) **United Nations Quarterly Bulletin of Steel Statistics for Europe.** No. 9, Dec. 1952, 115 pages. United Nations Sales and Circulation Department, Lake Success, N. Y.
Tabulated data on production of raw materials and finished steel. (A4, ST)

92-A. (Book.) **The Wire Reference Year Book and Directory, 1952-53. Ed. 2.** Alfred Hinde, Ltd., Clarence Street, Wolverhampton, England. 25s.
Introduces system of geographical coding enabling buyers to locate nearest suppliers of wire products and processes. Extensive wire bibliographies, articles on wire and furnaces, list of British standards, and tables. (A10, F28)

93-A. A Survey of World Trends in Some Non-Ferrous Metals. G. J. Brittingham. *Australasian Engineer,* Jan. 7, 1953, p. 73-77; disc., p. 77-79.
World resources and production rates of nonferrous metals. Need to conserve stocks by developing more efficient production methods for new metal, careful control and recovery of scrap metal, and greater efficiency in the use of metals generally. Tables. (A4)

94-A. How the Production Engineer Can Be Helped by the Metallurgist. J. D. Jevons. *Sheet Metal Industries,* v. 30, Feb. 1953, p. 105-113, 134; Mar. 1953, p. 207-212.
Designing to facilitate production, choice of manufacturing methods, stress raisers, cracks, microstructure, machinability, grinding, deduction of competitors' methods, how the metallurgical microscope can help the production engineer, and unusual problems. Photographs and micrographs. (A6)

95-A. British Columbia's Steel Industry, Past, Present, and Future. G. R. Heffernan. *Canadian Mining and Metallurgical Bulletin,* v. 46, Mar. 1953, p. 169-172.
Brief history of iron and steel in British Columbia; present operations of Western Canada Steel, Ltd.; review of iron ore resources and iron and steel markets; and a projection of what the future might hold for the industry.
(A4, B10, D general, ST)

96-A. Water Symposium. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 68-82; disc. p. 82-83.
Includes "Liquid Waste Treatment", C. S. Cassels; "Lukens Water Purification System", N. H. Jensen; "Current Practice in Water Pollution Abatement", B. P. Martinez; and "Operating Experience With Waste Water Treatment Plants", F. C. Schoen. (A8)

97-A. Recovery of Tin From Scrap Tinplate. A. J. Krombholz. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 98-105; disc. p. 105-106.
Alkaline detinning and tin recovery process. Equipment used for

handling and processing scrap. Photographs. (A8, Sn)

98-A. Comparative Investment Costs for Different Steelmaking Processes. Charles F. Ramseyer. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 122-134.

A study of the relative capital investments required to make steel by different processes. Tables. (A4, D general, ST)

99-A. Modern Developments in the Spanish Iron and Steel Industry. *Mining Journal,* v. 240, Mar. 13, 1953, p. 302-303.

Condensation from *Monthly Statistical Bulletin,* v. 28, no. 1. Brief history of Spain's iron and steel industry, as well as a summary of her home and colonial iron ore deposits. Describes proposed Avilés plant. (A4, B10, Fe, ST)

100-A. Analysis of Western Metalworking. *Western Metals,* v. 11, Mar. 1953, p. 65-76.

Growth of Western metal industries including size and growth by state and industry; defense work plus consumer production; and factors for further expansion. Photographs and graphs. (A4)

101-A. Western Primary Metals Production Races to Keep Pace With Demand. *Western Metals,* v. 11, Mar. 1953, p. 77-81.

Increased use of steel, Al, Cu, Zr, Ti, and Mg. Graphs and photographs. (A4, ST, Al, Cu, Zr, Ti, Mg)

102-A. Outlook in Principal Consuming Industries for Porcelain Enameled Products. R. C. Myers. *Finish,* v. 10, Apr. 1953, p. 37, 66.

Includes short-range outlook for '53 and significant longer range factors. (A4, T general)

103-A. Five Year Review of Tin. *Metal Bulletin,* Mar. 13, 1953, p. 11-13.

Extracts from "Tin and the Tin Study Group, 1948-52", published by International Tin Study Group, The Hague, Netherlands. Production, consumption, price, and stocks. Tables. (A4, Sn)

104-A. New Metallurgical Research Center in France. *Metal Progress,* v. 63, Mar. 1953, p. 83-86.

The new center of the Research Institute for Ferrous Metallurgy (IRSID), which is to conduct technical and scientific research on all types of ferrous metallurgy. (A9)

105-A. Current Russian Metallurgical Texts-II. Carl A. Zapffe. *Metal Progress,* v. 63, Mar. 1953, p. 91-95.

Reviews 12 official publications recently issued by the Governmental Scientific-Technical Publishing House in Moscow. (A general)

106-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 19, Dec. 1952, p. 519-526; v. 20, Jan. 1953, p. 35-42; Feb. 1953, p. 71-78; Mar. 1953, p. 123-130.

These installments define "Elastic Strain" to "Emerald Nickel", "Emery" to "Etchant", "Etchant" to "Ferrite Ghost", and "Ferrites to Folding Test". (To be continued.) (A10)

107-A. Open Hearth Dust Control. S. Vajda and G. M. Dreher. *Proceedings of the 45th Annual Meeting,* Air Pollution and Smoke Prevention Association of America, Inc., 1952, p. 26-32; disc., p. 36, 39-40.

Test using sonic units with types "D" and "W" Rotoclones, Multiclone, Trion precipitator, type "N" Rotoclone, and Impingo Pebble filter. (A5, D2)

108-A. A Foundry Equipment Manufacturer's Reaction to Air Pollution Ordinances. John M. Kane. *Proceedings of the 45th Annual Meeting,* Air Pollution and Smoke Prevention Association of America, Inc., 1952, p. 45-46; disc., p. 46-47.

Control equipment in many ferrous foundries. (A5, E general)

109-A. The New Patent Law of 1953. H. A. Toulmin, Jr. *Product Engineering,* v. 24, Apr. 1953, p. 186-189.

Explains meanings of changes in the patent law. (A6)

110-A. (Book) **Mechanical World Year Book. 1953.,** v. 66. 268 pagese. Emmott & Co., Ltd., 21 Bedford St., London, W.C.2, England. 3/6 net.

Contains mathematical tables, classified buyers' directory, and a new section on spring design. (A general, Q general)

111-A. (Book) **Men of Steel.** Arthur Pugh. 624 pages. Iron and Steel Trades Confederation, London, England. 21s.

Development of trade unionism and the progress of human relations in the industry. Tells what the unions did, why they did it, and what followed. (A6, ST)

112-A. (Book) **Methods for Treating Metal-Finishing Wastes.** 72 pages. Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati, 2. $2.00.

Techniques, reactions, and design considerations in methods of handling industrial wastes. Advantages and weaknesses for each method. (A8)

113-A. (Book) **Nomenclature.** 20 pages, Apr. 1952. Aluminum Assoc.,

420 Lexington Ave., New York 17, N. Y.

A glossary of terms for Al products. Includes sheet, plate, extrusions, and tubular products. (A10, Al)

114-A. (Book.) **Transactions of the American Society for Metals.** v. 45. Ray T. Bayless, editor. 1152 pages. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $10.00.

Includes 50 papers, presented at the Thirty-Fourth Annual Convention of the Society, held in Philadelphia, Oct. 18-24, 1952, and at Western Metal Congress in Los Angeles, Mar. 23-27, 1953. Some were abstracted as preprints; others are abstracted in this issue. (A general)

115-A. (Book—French.) **(Metallurgy.) Metallurgie. Ed. 65.** R. Cazaud. 372 pages. 1953. Dunod, 92 Rue Bonaparte, Paris 6, France. 450 fr.

Condensed pocketbook of metallurgical information covers some 30 metals, briefly giving their properties, basic qualities, and metallurgical characteristics. Separate sections are devoted to metal corrosion, heat treatment, and testing. Data tables and common formulas are included. (A general)

116-A. (Book—Russian.) **Notes on the History of the Metallurgy of the Light Metals.** A. I. Belyaev. 142 pages. 1950. Governmental Scientfic-Technical Publishing House, Moscow, U.S.S.R.

Histories of Al, Mg, Be, and Li from a Russian point of view. (A2, Al, Mg, Be, Li)

117-A. (Book—Russian.) **D. K. Chernov (Tschernoff).** B. E. Volovik. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Historical account of the work done by D. K. Tschernoff in the field of metallurgy. (A2)

118-A. Safety Practices in the Production of Ductile Iron. Robert E. Savage. *American Foundryman,* v. 23, Apr. 1953, p. 145-149.

General discussion of the hazards involved when Mg is added to iron. Safety recommendations. 13 ref. (A7, E general, Mg, CI)

119-A. Fire Protection System Guards Scrap Baler. Morton Lissner. *Iron Age,* v. 171, Apr. 16, 1953, p. 126-127.

Automatic system for protecting baler and pit, machinery space, and control room. Photographs. (A7)

120-A. Manganese From Open Hearth Slag Could Supply Half of U. S. Needs. R. C. Buehl, M. B. Royer, and J. P. Riott. *Journal of Metals,* v. 5, Apr. 1953, p. 520-521.

Process for the recovery of Mn from openhearth slag. (A8, D2, Mn)

121-A. Sweden's Iron & Steel Industry. *Metal Bulletin,* Special Swedish Iron & Steel Issue, Mar. 1953, p. 3, 5, 7-9, 11-14, 17, 19, 21-22.

Processes of production; exports and imports. Lists and describes principal steel works. (A4, Fe, ST)

122-A. Engineering for Hot Chemistry. Peter Bell. *Canadian Metals,* v. 16, Apr. 1953, p. 48, 50.

Problems involved in laboratory handling of radioactive materials. Some of the constructional and other techniques used. (A5)

123-A. Archaeology and Metallurgy. R. J. Forbes. *Edgar Allen News,* v. 32, Apr. 1953, p. 89-92.

How metallurgy contributes to understanding early cultures. Photographs. (A3)

124-A. Metal-Finishing Wastes Treatment at the Meadville, Pa., Plant of Talon, Inc. Harry W. McElhaney. *Sewage and Industrial Wastes,* v. 25, Apr. 1953, p. 475-482; disc., p. 482-483.

Program for waste disposal of cyanides, acids, chrome, cutting oils, and caustics. (A8)

125-A. Reuse Waste Pickling Liquors. Allen G. Gray. *Steel,* v. 132, Apr. 27, 1953, p. 130, 133.

Process by which waste pickle liquors are regenerated with hydrogen chloride. No undesirable by-products are left. (A8, L12)

126-A. Safety in Wire Drawing Operations. A. E. Asel. *Wire and Wire Products,* v. 28, Apr. 1953, p. 374-375, 378, 421.

Causes of more common accidents and measures taken to avoid their repetition. (A7, F28)

127-A. Capacity, Products, Future of the Canadian Steel Industry. R. D. Hindson. *Engineering Journal,* v. 36, Apr. 1953, p. 390-394.

Statistics show growth by the end of 1953 as compared to prewar. Present expansion and products which Canadian mills can supply. Tables. (A4, ST)

128-A. Safety for the Steel Men. Ken Yarber. *Industrial Photography,* v. 2, Apr. 1953, p. 10-12, 14.

Photography is used to show both the safe and unsafe way to handle any operation and illustrates what may happen when unsafe practices are used. Photographs. (A7, ST)

129-A. Co-Operative Research *Met-*

al Industry, v. 82, Apr. 17, 1953, p. 309-311.

Briefly describes work of the British Non-Ferrous Metals Research Association. Photographs. (A9)

130-A. A Research Engineer Looks at Metallurgy. C. G. A. Rosen. *Metal Progress,* v. 63, Apr. 1953, p. 93-96, 194, 196.

Emphasizes closer cooperation between designers and metallurgists in a conservation program. Illustrations of what has been done. Diagrams and micrographs. (A9)

131-A. Sparks From Aluminium Paint the Firedamp Ignition Hazard. C. S. W. Grice. *Product Finishing,* v. 6, Apr. 1953, p. 58-63.

Experiments showed the danger of frictional sparks produced when rusty iron or steel coated with Al paint or sprayed Al is struck by another piece of the metal. (A7, Al)

132-A. The Bright Picture of Aluminum. Charles A. Scarlott. *Westinghouse Engineer,* v. 13, May 1953, p. 92-97.

Producers, development of the industry, sources, price, applications, and future prospects. Photographs. (A4, Al)

133-A. (Book.) **Engineering Manufacturing Methods.** Gilbert S. Schaller. 613 pages. 1953. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $7.00.

Aspects of manufacturing such as founding, machining, welding, hot and cold forming, heat treatment, and engineering materials. Covers light metals, plastics, copper-base alloys, and iron and steel materials. (A general, Al, Mg, Cu, ST)

134-A. (Book.) **Iron and Steel Works of the World.** H. G. Cordero, editor. 651 pages. Quin. Press, Ltd., London, England. 50s net.

Review of major plants of the iron and steel industry covering 1100 works in five continents. For each, data include address of head office, directors, capital, telegraphic address, telephone number, products, and sales offices. (A4, ST)

135-A. Visual Aids. L. G. Ekholm. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 287-290.

Methods of training openhearth personnel. (A6, D2)

136-A. Training Program, South Works. M. F. Yarotsky. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 291-293; disc., p. 293-294.

Outline of a proposed training program for first helpers. (A6, D2)

137-A. Training Open Hearth Personnel at the Ford Motor Company. C. W. Conn. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 295-301.

Need for training programs, how they are planned, and the type of subject matter presented. (A6, D2)

138-A. Training Program for Furnace Personnel, Ohio Works, U. S. Steel Company. E. E. McGinley. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 302-303.

Outline of discussion program. (A6, D2)

139-A. Training Program for Open Hearth Employees, Jones and Laughlin, Pittsburgh Division. H. L. Tear. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 303-304.

General discussion of program which includes lecture and discussion meetings for workers. (A6, D2)

140-A. Training Open Hearth Personnel. A. H. Osborne. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 305-306; disc., p. 306.

Projects in personnel training. (A6, D2)

141-A. Some Canadian Developments in Metallurgy. A. F. Cadenhead. *Canadian Metals,* v. 16, May 1, 1953, p. 24-25.

Review of some of the major developments that took place during 1952 in the field of metallurgy. (A general, Al, Ti, Ni, Cu)

142-A. Buick Washes Away Waste Problem. Herbert Chase. *Industry and Power,* v. 64, May 1953, p. 67.

Disposal of foundry wastes. Photographs. (A8, E general)

142-A. The European Zinc Industry. R. Lewis Stubbs. *Metal Bulletin,* Apr. 28, 1953, p. 7-11; May 1, 1953, p. 16-18.

Development, present situation, and prospects. Tables. (A4, Zn)

143-A. The Outlook for Copper, Lead, and Zinc. Clyde Williams. *Monthly Business Review,* v. 35, May 1953, p. 8.

Future needs of Cu, Pb, and Zn and their possible replacement by Al, Mg, iron, steel, and/or plastics. (A4, Cu, Pb, Zn, Al, Mg, Fe, ST)

144-A. Dust Collection Is "Big Business" at Norton Company. A. F. Hardy, Jr. and W. J. Samborski. *Plant,* v. 7, May 1953, p. 61-63.

The objectives and some of the procedures of efficient dust collection in the manufacture of grinding

wheels and abrasives. Shows how average dust-count of less than 5 million particles per cubic foot is achieved through proper selection of equipment, adequate design of dust hoods, automatic cleaning cycles, and an extensive program of preventive maintenance. Photographs. (A5)

145-A. Non-Ferrous Scrap Recovery. A. J. Cripps. *Australasian Engineer,* Mar. 1953, p. 59-62; disc., p. 62-65.

Sources of scrap and recovery methods for Al, Cu, Pb, and Zn alloys. (A8, Al, Cu, Pb, Zn)

146-A Development of Special Pumps for Liquid Metals. Their Power Supply, Valves, Bearings, and Instrumentation. Edward F. Brill. *Mechanical Engineering,* v. 75, May 1953, p. 369-373.

Electromagnetic and mechanical pumps. (A general)

147-A. Disposal of Plating Room Wastes. V. Treatment of Cyanide Waste Solutions by Ion Exchange. Charles A. Walker and Walter Zabban. *Plating,* v. 40, Feb. 1953, p. 165-168; Mar. 1953, p. 269-278.

Nature of ion exchange, reviews previous work, apparatus, analytical procedures, and reagents. Extensive tables. (A8, L17)

148-A. (English and French.) **Changes in the World Iron and Steel Industry, 1929-1952.** *Monthly Bulletin of Statistics, United Nations,* v. 7, May 1953, p. vii-xvi.

Data pertaining to world production and consumption. Tables, graphs. (A4, CI, ST)

149-A. (German.) **Occupational Skin Eczema in Electroplating Work and Its Prevention.** Wilfried Kohl. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B1-B2.

The disease and preventive measures. (A7, L17)

150-A. (German.) **Importance and Output of the German Nonferrous Metal Industry.** H. Sennekamp and A. Vath. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 2-7.

An economic appraisal emphasizing productivity, capacity, further standardization, and research. Tables. (A4, EG-a)

151-A. Advances in Chemical Metallurgy. A. F. Cadenhead. *Canadian Chemical Processing,* v. 37, May 1953, p. 38, 40.

Advancements in recovering products from wastes. (A8)

152-A. Spheroidal-Graphite Iron up to Date. W. W. Braidwood. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B94-B105; disc., p. B105-B107.

Surveys progress of the development of spheroidal-graphite iron, determines position now reached, and presents forecast of its future. Micrographs, photographs. 31 ref. (A4, CI)

153-A. The Crisis in Metals. F. L. Church. *Modern Metals,* v. 9, May 1953, p. 69-74, 76-78, 80.

Economic decline of Zn and Pb. Views of leading men in the industries. (A4, Zn, Pb)

154-A. (French and German.) **Copper and Health.** *Pro-Metal,* v. 6, no. 32, Mar. 1953, p. 139-147.

Applications for Cu. Concludes that it can be used generally without endangering health. Photographs, tables. (A7, Cu)

155-A. Reduction of Plating Waste Losses by Reclaim Tanks. C. F. Hauri. *Sewage and Industrial Wastes,* v. 25, May 1953, p. 586-590.

Mechanical methods in which procedures reduce amount of cyanide reaching the sewer effluent. Diagrams. (A8, L17)

156-A. (French.) **Tungsten and Wolfram.** L. Perruche. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 82-86.

Sources, world markets, and uses of W. (A4, T general, W)

157-A. (Book). **Statistical Yearbook. Statistical Office of the United Nations.** 554 pages. 1953. Columbia Univ. Press. $7.50.

Contains a collection of world statistics of interest to metallurgists and mining engineers. Production, consumption, and industrial growth are presented in table form. Minerals and metals are treated individually and by nation. (A4)

158-A. (Book—German.) **(Chemical Technology. Metallurgy/General.) Chemische Technologie. Metallurgie/Allgemeines.** Karl Winnacker and Ernst Weingaertner. 846 pages. 1953. Carl Hanser Verlag, Munich, Germany.

Includes chapters on ore dressing, alkali metals, industrial production of Mg, nonferrous heavy metals, and protection of metallic surfaces. (A general)

159-A. (Book—German.) **(Fundamentals of Metallurgy.) Grundlazen der Metallurgie.** Ch. K. Awetissjan. 242 pages. 1951. Verlag Wilhelm Knapp, Halle (Saale), Germany. (Translated from the Russian by Friedrich Krantz.)

Fundamentals for the student and practicing metallurgist. Elements of

metallography; physical and chemical processes in metallurgy; and fundamentals of wet metallurgical processes. (A general)

160-A. (Book—German.) (**"Ironworks" Handbook for Plant Engineers.) "Hütte" Taschenbuch für Betriebsingenieure. Ed. 4.** Hans Rögnitz, editor. 426 pages. Verlag Von Wilhelm Ernst & Sohn, Hohenzollerndamm 169, Berlin-Wilmersdorf, Germany. 36 Dm.

Materials; production methods; metallic and nonmetallic substances. Processes include casting, forging, cold pressing, welding, and all machining methods. Surface treatments are enameling, plating, and anodizing. (A general)

161-A. Wage Incentive for Cost and Production Control for Indirect Operators. C. J. Pruet. American Foundrymen's Society, Preprint 53-1, 1953, 8 p.

Application of complete indirect wage incentive plan. "Indirect work" is defined as the type of work required to indirectly assist or service the employees who perform direct work, eg. janitors, stock men, etc. (A6)

162-A. Are Your Costs Reliable? R. T. Lewis. American Foundrymen's Society, Preprint 53-59, 1953, 4 p.

Some common discrepancies inherent in costs developed from inadequate and incorrect cost systems of today. (A6)

163-A. High Output of Quality Gears Requires Tailor-Made Shop. H. J. Bates. *Iron Age,* v. 171, June 4, 1953, p. 141-145.

Plant layout in which there is coordination between design, heat treating, and production departments. Diagrams, photographs. (A5, J general)

164-A. Total Supply of Copper Available, Including Foreign Metal, Likely to Meet Demand in U. S. Louis S. Cates. *Metals,* v. 23, May 1953, p. 7, 11.

Reports that clearing up of confused price situation will take time and that scrap has moved more freely to refineries following end of controls. (A4, A8, Cu)

165-A. Sliding Scale Import Tax on Lead, Zinc Would be Detrimental to the Best Interests of U. S. Kenneth C. Brownell. *Metals,* v. 23, May 1953, p. 8.

Market conditions. (A4, Pb, Zn)

166-A. Domestic Zinc Output and Imports to Result in Surplus Supply of 76,000 Tons This Year. Howard L. Young. *Metals,* v. 23, May 1953, p. 9-10.

Factors which influence market forecasting. (A4, Zn)

167-A. U. K. to End Bulk Buying of Copper and Resume Free Trading on London Metal Exchange Aug. 5. L. H. Tarring. *Metals,* v. 23, May 1953, p. 12-13.

Statistics for United Kingdom. Cu, Sn, Pb, and Zn. (A4, Cu, Sn, Pb, Zn)

168-A. Gold. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 7.

Russia's output, industry in South Africa, price, and principal producers. (A4, Au)

169-A. Silver. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 9.

Production, prices, and consumption. (A4, Ag)

170-A. The Platinum Metals. *Mining Journal* (London), Annual Review, May 1953, p. 11.

Production and price. (A4, EG-c)

171-A. Copper. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 13, 15.

Major producers. (A4, Cu)

172-A. Tin. Ursel Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 17, 19.

Production, consumption, and world's smelter capacity. (A4, Sn)

173-A. Lead. *Mining Journal* (London), Annual Review, May 1953, p. 21.

Influence of easing free market and re-opening Metal Exchange. Considers supply and demand in U. S. and world output. (A4, Pb)

174-A. Zinc. *Mining Journal* (London), Annual Review, May 1953, p. 23.

1952 Zn situation. (A4, Zn)

175-A. Aluminium. A. Graham Thomson. *Mining Journal* (London), Annual Review, May 1953, p. 27, 29.

Production in 1952. (A4, Al)

176-A. Magnesium. *Mining Journal* (London), Annual Review, May 1953, p. 30.

Excess U. S. production and position in United Kingdom. (A4, Mg)

177-A. Titanium. *Mining Journal* (London), Annual Review, May 1953, p. 31.

1952 production. (A4, Ti)

178-A. Antimony. *Mining Journal* (London), Annual Review, May 1953, p. 35.

Considers falling prices and possibility of increasing stockpiles. (A4, Sb)

179-A. Nickel. A. Graham Thomson. *Mining Journal* (London), An-

nual Review, May 1953, p. 37.
Production and prices. (A4, Ni)

180-A. Chromium. *Mining Journal* (London), Annual Review, May 1953, p. 38.
World producers. (A4, Cr)

181-A. Cobalt. *Mining Journal* (London), Annual Review, May 1953, p. 39.
1952 supply. (A4, Co)

182-A. Manganese. *Mining Journal* (London), Annual Review, May 1953, p. 41.
Position in U. S. (A4, Mn)

183-A. Tungsten, Molybdenum and Vanadium. *Mining Journal* (London), Annual Review, May 1953, p. 42-43.
Position of each. (A4, W, Mo, V)

184-A. Beryllium. *Mining Journal* (London), Annual Review, May 1953, p. 45.
Production in U. S., Brazil, and Southern Africa. (A4, Be)

185-A. Columbium and Tantalum. *Mining Journal* (London), Annual Review, May 1953, p. 47.
Exploitation of sources. (A4, Cb, Ta)

186-A. Iron and Steel. *Mining Journal* (London), Annual Review, May 1953, p. 49, 51.
Output expansion, activity in Western Europe, problems of the British industry, coking capacity, and expansion of pig iron production. (A4, D1, CI, ST)

187-A. Developments in Production of Alloys. A. E. Williams. *Mining Journal* (London), Annual Review, May 1953, p. 105-107.
Developments in cast iron, alloy steels, nitriding process, creep resistant alloys, Ni-Al bronzes, Ni-Ag, foundry practice, and die casting. (A general, J28, E general, Cu, CI, AY)

188-A. Air Conditioning Gives You Fast Money Return. H. P. Bailey. *Power,* v. 97, June 1953, p. 73-75.
Advantages and costs of installing air conditioning in metalworking plants. Photographs. (A7)

189-A. Pre-Planning Doubles New Plant's Output. *Steel,* v. 132, June 1, 1953, p. 110-112.
Savings and production increases for a manufacturer of spray painting equipment and water cooling towers resulted from planned process layout, building architecture, and engineering. Photographs. (A5)

190-A. Hubbard and Company. 110 Years of Expansion. Harold C. Hood. *Steel Processing,* v. 39, May 1953, p. 225-241.
Origin and growth of a large producer of high-quality forged and machined items. Manufacture of pole-line hardware, tapered Al tubing products, and tools are included. Photographs. (A5, T6, Al, Cu, ST)

191-A. A Special Survey of the Shotton Works of John Summers and Sons, Limited. *British Steelmaker,* v. 19, May 1953, p. 231-246, 249-299, 301-325, 327-340.
A century of steelmaking; blast furnace plant; coke ovens and by-product plant; new steel plant; power supply and distribution; works' services; rail traffic layout and operation; 42-in. slabbing mill; continuous hot strip mill; cold reduction and ancillary processes; galvanizing, finishing, and packing; progress in metallurgical and chemical control; personnel and welfare; and review of plant equipment. Photographs. (A5, D general, F general, ST)

192-A. Uranium in Canada 1952. A. H. Lang. *Canadian Mining and Metallurgical Bulletin,* v. 46, May 1953, p. 309-314.
Canadian production and development work on U. (A4, U)

193-A. Presidential Address to the Institution of Metallurgists. L. B. Pfeil. *Engineering,* v. 175, May 22, 1953, p. 651-652.
Metallurgical developments in the last 30 years. (A2)

194-A. Why. Where. How. Dust Control in Metalworking Shops. James R. Kayse. *Machine and Tool Blue Book,* v. 49, June 1953, p. 160-166, 168.
Dust control systems for cut-off wheels, machine tools, metal cleaning operations, metal spraying, and welding. Tables, photographs. (A5)

195-A. Metalworking Plant Squeezes "Juice" From Scrap. Operation Returns a Profit. James Joseph. *Machine and Tool Blue Book,* v. 49, June 1953, p. 170-172, 174.
Process for recovery of cutting oils from Al and steel chips. Photographs. (A8, Al, CN)

196-A. Protect Yourself Now Against Future Materials Shortages. John Kelso. *Product Engineering,* v. 24, June 1953, p. 146-149.
Fundamental approaches to materials conservation with supplemental information on current government controls. Graphs. (A general)

197-A. (German.) **Structure and Development of Iron, Sheet, and Metal-Wares Industry.** Erhard Wunsch. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 285-291.
Industrial aspects and trade developments. Graphs, tables. (A4, Fe)

198-A. (German.) **Slackening in Economy of Cu Raw Materials.** Richard Broh. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 293-294.
Cu supply of various countries. (A4, Cu)

199-A. (German.) **Production and Working of Metals in Brazil.** Hans Link. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 294.
Increasing self-sufficiency efforts of Brazil. (A4, Cu, Zn, Al, Sn, Ni, Pb)

200-A. (German.) **Socialization of Indonesian Tin Industry.** *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 295.
Financial-control measures. (A4, Sn)

201-A. (German.) **Radiation Damage to Eyes of Metal Workers.** W. Schweissheimer. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 296.
Industrial injury by ultraviolet and infrared rays from various sources. (A7)

202-A. (German.) **Excess of Aluminum in England.** *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 296.
Market shift and its effect on labor. (A4, Al)

203-A. (German.) **Electrical Equipment for Cranes Iron and Steel Works.** Hermann Enke. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 528-538.
Increasing safety of control operations by means of semi-automatic gear. Photographs, diagrams, tables. 6 ref. (A5)

204-A. (German.) **Recent Developments in Design of Iron and Steel Works Cranes.** Hellmut Ernst. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 538-545.
Evolution of mechanical and electrical components. Photographs, diagrams. 9 ref. (A5)

205-A. (German.) **Innovations in Crane Design and Efforts to Improve and Simplify Their Construction.** Erich Kemana. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 545-556.
Overcoming obstacles in design improvements. (A5)

206-A. Electromagnetic Pumps for High-Temperature Liquid Metal. J. F. Cage, Jr. *Mechanical Engineering,* v. 75, June 1953, p. 467-471.
Different types of electromagnetic pumps which utilize "motor" principle. Graphs, photographs. (A5)

207-A. Guide for Stainless Steel Buyers. *Steel,* v. 132, sec. 2, June 22, 1953, p. 1-160.
Sizes and types of stainless in tabulated form, with list of producers. (A10, SS)

208-A. (French.) **Tendencies of Technical Research in French Ferrous Metallurgy.** H. Malcor. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 159-161, 163, 165.
Present and future problems of the industry. (A9, Fe)

209-A. (French.) **Management and Organization of Metallurgical Concerns.** P. Lamy. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 219, 221, 223.
Functions of the commercial service, its "tools", and its relations to manufacturing and bookkeeping. (To be continued.) (A5)

210-A. (German.) **The Bull Market in Tungsten Capsized.** *Metall,* v. 7, nos. 9-10, May 1953, p. 376.
Market responses. (A4, W)

211-A. (German.) **Position and Economic Importance of Antimony.** Walter Gehr. *Metall,* v. 7, nos. 9-10, May 1953, p. 377-379.
Occurrence, production, important ore producers, smelting production, exporting countries, world reserves, prices, and future developments. Tabulations. (A4, Sb)

212-A. (German.) **Maneuvers and Conversions in the Metal Industry, 1950-1952.** *Metall,* v. 7, nos. 9-10, May 1953, p. 380-381.
General economic picture and specific economy of metals. Tables. (A4)

213-A. (German.) **Is Overproduction of Aluminum to be Expected.** E. Rauch. *Metall,* v. 7, nos. 9-10, May 1953, p. 382-383.
Statistics for various countries and Europe in general. (A4, Al)

214-A. (German.) **The State as Contractor in Metals.** *Metall,* v. 7, nos. 9-10, May 1953, p. 384.
Socialization in metals production. (A4)

215-A. (German.) **Signs of a Bear Market in World Metals.** *Metall,* v. 7, nos. 9-10, May 1953, p. 385-386.
Picture for Cu, Zn, Pb, Sn, and Al. (A4, Cu, Zn, Pb, Sn, Al)

216-A. (German.) **The West German Metals Market.** *Metall,* v. 7, nos. 9-10, May 1953, p. 386-387.
Status of Cu, Zn, Pb, Sn, and Al. (A4, Cu, Zn, Pb, Sn, Al)

217-A. (German.) **The European Community's Common Market in Coal and Steel.** Franz Etzel. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 689-696.
Presents the essence and aims of the common market by defining terms; economic fundamentals; individual demands; customs, storage, and transfer problems; and future prospects. (A4, A5, ST)

218-A. (German.) **Recovery of Copper in the Production of Copper Fibers.** Franz Gerstner. *Zeitschrift für Elektrochemie; Berichte der Bunsengesell-*

schaft für physikalische Chemie, v. 57, no. 3, 1953, p. 221-225; disc., p. 225.

Shows how copper in "blue water" from the production of cuprammonium silk can be recovered by means of ion exchange. Tables, graphs. 12 ref. (A8, Cu)

219-A. (German.) **Small Iron Industry as a Feeder to Heavy Industry.** E. Schrieder. *Zeitschrift des Vereines deutscher Ingenieure (VDI),* v. 95, nos. 14-15, May 15, 1953, p. 462-464.

Draws line between types of manufacturing undertaken in "light" and "heavy" industry. Diagrams. 5 ref. (A5)

220-A. (Book.) **Introductory Engineering Materials.** Irving H. Cowdrey and E. L. Bartholomew, Jr. 424 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $6.00.

Materials, what they are, and the relationships between structures, treatments, and properties. Photomicrographs of metallic structures are used to show how internal structures result from certain composition and properties, and in turn determine the mass characteristics. (A general)

221-A. (Book.) **Tool Engineers Data Book.** G. J. Gruen. 219 p. 1953. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $5.50.

Data on general properties of special alloys, heat treatment of special alloys and stainless steels, and spot identification of metals. Includes conversion tables, mathematical tables, and glossary of metallurgical terms. (A general, Q general, J general, S10, S22)

222-A. Certain Metallic Material in Short Supply in the Iron and Steel Industry. I. Steel Scrap for Remelting. II. Substitute Alloy Steels. A. B. Scott. *Australasian Engineer,* April 7, 1953, p. 53-62; disc. p. 62-65, 121, 123-125.

Part I: Classification and importance of steel scrap to the iron and steel industry. Scrap identification, segregation, preparation for processing, and utilization. Part II: Use of substitute alloy steels to conserve strategic alloying elements. Use of B as an alloying element. Composition and properties, particularly hardenability, of substitute types of carburizing steels, structural steels, toolsteels, and corrosion and heat resisting steels are compared with the standard grades normally specified. Graphs, tables. (A8, B, ST, AY, TS, CI)

223-A Metallurgical Research. Some of the Work of the British Non-Ferrous Metals Research Association. *Automobile Engineers,* v. 43, June 1953, p. 258-262.

Cr plating in general and on Al; use of electron microscope; work on stretcher-strain markings; and corrosion of nonferrous metals. Photographs. (A9, L17, M21, Q24, R general, Cr, Al, EG-a)

224-A. Mineral Resources and Our Economy. Richard J. Lund. *Battelle Technical Review,* v. 2, July 1953, p. 70-75.

Need for conservation, long-term demand-supply picture, effect of technological advances, role of substitution, price, and foreign supplies. Graphs. (A4, B10)

225-A. Brighter Future for the Rare Earths. Roland B. Fischer. *Battelle Technical Review,* v. 2, July 1953, p. 76-77.

Factors encouraging expanded use and sources of rare earths. Interest of Atomic Energy Commission. (A4, B10, EG-g)

226-A. The Present and Future Metallurgical Requirements of the Chemical Engineer. Christopher Hinton. *Institute of Metals, Journal,* v. 81, June 1953, p. 465-470.

Increasing demands of the chemical engineer upon the metallurgist for new materials. (A5)

227-A. A Dynamic Program for Conservation. J. R. Townsend. *Metal Progress,* v. 63, June 1953, p. 79-81.

Conservation of strategic elements by substitution of more plentiful elements; reprocessing and redesigning products; more standardization, and opening up new sources. (A8)

228-A. More Foreign Aluminum Needed in Third Quarter to Offset Current Shortage in Prime Industry. Edmund Dillworth. *Metals,* v. 23, June 1953, p. 7-8.

Al supply and demand from 1947 to the present and the outlook for the future. (A4, Al)

229-A. (German.) **Planned Cost Calculations in the Iron Industry.** Hans Diercks and Franz Petzold. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 183-190.

Computations from other industries and from American Fe industry are basis for discussion of similar figures for German Fe industry. A new system is introduced. Tables. (A4, Fe)

230-A. Pure and Applied Science in Metallurgy. Cyril Stanley Smith. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 11-20.

Place of metallurgy in science; university and industrial research; and government vs. business research. (A9)

231-A. Outlook for Steel Consumption. Steel Demand. Bay E. Estes. *Analysts Journal,* v. 9, June 1953, p. 93-98.

Method of forecasting steel demand, short-term outlook for steel, and longer-range prospects. (A4)

232-A. Lead & Zinc. *Engineering and Mining Journal,* v. 154, July 1953, p. 130-137.

Current demand and supply and plans for future. Tables, photographs. (A4, Pb, Zn)

233-A. Copper. *Engineering and Mining Journal,* v. 154, July 1953, p. 110-119.

New Cu projects operating, in construction, or planned. Table, photographs, (A4, Cu)

234-A. Aluminum. I. W. Wilson, R. S. Reynolds, Jr., and Nathanael V. Davis. *Engineering and Mining Journal,* v. 154, July 1953, p. 120-129.

Current world production and future plans. Tables, photographs. (A4, Al)

235-A. Uranium. *Engineering and Mining Journal,* v. 154, July 1953, p. 138-141.

World production. Table, photographs. (A4, U)

236-A. Titanium. *Engineering and Mining Journal,* v. 154, July 1953, p. 142-145, 316.

Research developments. Photographs. (A9, Ti)

237-A. Nickel-Cobalt. *Engineering and Mining Journal,* v. 154, July 1953, p. 146-149.

World areas of production. Photographs. (A4, Ni, Co)

238-A. Notes on European Furnace Practice. Matthew H. Mawhinney. *Industrial Heating,* v. 20, July 1953, p. 1315-1316, 1318.

Furnace development, fuel utilization, and furnace practice. (A5)

239-A. Welding Torch Fires. H. Edgar Beaven. *Factory Management and Maintenance,* v. 111, July 1953, p. 132-133.

Prevalence of the fires, how they start, and prevention. (A7, K2)

240-A. Disposal of Plating Room Wastes. VI. Treatment of Plating Room Waste Solutions With Ozone. *Plating,* v. 40, July 1953, p. 777-780.

Mechanism and extent of oxidation of free and metallo-complex cyanides by ozone and possible application in treatment of waste solutions. Table, diagrams. (A8, L17, Cu, Zn)

241-A. (French.) **Canadian Hydro-Electric Development Nechako-Kemano-Kitamat and Aluminum Production.** *Journal du Four Electrique,* v. 62, no. 2, Mar.-Apr. 1953, p. 48-49.

Gigantic Canadian Kitamat hydroelectric station which will produce 1,670,000 h.p.—most powerful in world. Map, photograph. (A5, C general, Al)

242-A. (Book.) **American Iron and Steel Institute, Regional Technical Meetings, (Annual Volume),** 1953. 516 p. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Consists of 26 addresses presented at a series of 5 meetings. (A general, D general, ST)

243-A. (Book.) **The European Steel Industry and the Wide-Strip Mill.** 100 p. 1953. United Nations Economic Commission for Europe, Industry Division.

Past production and consumption trends in the U. S. and Western Europe. Future trends are analyzed. Industrial uses of wide strip, exports, and markets. (A4, ST)

244-A. (Book.) **Introduction to Industrial Metallurgy.** Leslie Aitchison. 456 p. 1949. MacDonald & Evans, 8 John St., Bedford Row, W.C.1, London, England.

Structure, organization, operation, and control of the metallurgical industry. (A4)

245-A. (Book.) **Iron and Steel Directory. Ed. 7.** 386 p. 1953. Louis Cassier, Co., Ltd., Dorset House, Stamford St., London, S.E.1, England. 25s. (postage 8d.)

A guide to British pig iron manufacturers, iron founders, steel founders, and steelworks. Also contains technical data for engineers, metallurgists, and iron and steel makers and users. Includes typical compositions for various grades of iron, steel, and ferro-alloys; abstracts of British specifications for ferrous materials; and a number of useful conversion tables. (A10, S22, ST)

246-A. (Book.) **Technology of Engineering Materials.** B. Richard Hilton. Butterworth Scientific Publications, Bell Yard, Temple Bar, London, W.C.2. 36s.

Includes pattern-making and patterns; molding and foundry practice; production of ferrous metals and alloys; mechanical treatment of steels; heat treatment of ferrous metals and alloys; production of nonferrous metals and alloys; mechanical and heat treatment of nonferrous metals and alloys. (A general)

247-A. (Book—German.) **(Outline of General Metallurgy.) Grundriss der Allgemeinen Metallkunde.** E. Brandenburger. 333 p. 1952. Ernst Reinhardt Verlag, Basel, Switzerland.

Fundamentals of metallurgy. Pure metals, various types of alloys, and chemical reactions of metals. (A general)

248-A. Ion Exchange Finds Wider Use in Concentration and Recovery of Metals From Dilute Solutions. A. B. Mindler and C. F. Paulson. *Journal of Metals,* v. 5, Aug. 1953, p. 980-985.

Equipment, uses of ion exchange, concentration, recovery, limitations and possible applications in hydrometallurgy. Diagrams, graph, photograph. 25 ref. (A8)

249-A. Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 163-170; May 1953, p. 205-212; June 1953, p. 273-280; July 1953, p. 313-320.

April issue covers "Foliated" to "Gadolinium"; May from "Gagger" to "Gneiss"; June "Gold" to "Hanger Crack"; and July "Hanging" to "Hiperco". (To be continued.) (A10)

250-A. Commercial Importance of Titanium Increasing, Market Potentially May Equal Stainless Steel. Franz R. Brotzen. *Metals,* v. 24, July 1953, p. 9-10, 17.

Uses, cost, recovery and chemical analysis of Ti as related to supply and demand. Tables. (A4, Ti)

251-A. The Economic Geology of the New Metals. Charles E. Melbye, Ben H. Parker, and Marshall C. Parsons. *Mines Magazine,* v. 43, Mar. 1953, p. 61-66.

Ores, economic value, and properties of Ti, Zr, Hf, Nb, Ta, In, Ge, Ga, Li, Cs, Rb, Se, Te, and rare earth metals. Photographs, table. (A4, EG-d, e, f)

252-A. Buick Foundry's Dust Collectors Build "Dunes" Under Water. P. J. Leisen. *Plant,* v. 8, July 1953, p. 36-38.

Multiple-wash collectors which remove dirt and dust from cleaning room, core room, cupolas, sprue mills and knockout benches. Photographs. (A5, E general)

253-A. (French.) **Treatment of Aluminum Scrap for Producing Ingots With a High Technological Value.** Jacques Spirytus. *Fonderie,* May 1953, p. 2417-2430.

Defects existing in secondary Al ingots. Causes and remedies for porosity, cracking and gas holes. Photographs, diagrams, tables. 22 ref. (A8, E25, Al)

254-A. (French.) **In 1952 the Pechiney Co. Beat Its Own Production Records.** G. A. Baudart. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 127-129.

Increasing use and production of Al. Compares French position with world situation. (A4, Al)

255-A. (German.) **Economic Survey.** *Giesserei,* no. 13, June 25, 1953, p. 346-347.

Tabulates production figures on cast iron and cast steel in Germany from 1946 to March 1953. (A4, CI)

256-A. (German.) **Evolution of Production of Slag Wool in United Austrian Iron and Steel Works at Linz.** Othmar Rosenauer. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 845-847.

Evolution of process. Wool emerges as continuous fabric of quality superior to early product. Waterproofing experiments in progress. Diagrams. (A8)

257-A. (Portuguese.) **Metallurgy as a Factor in the Development of a Nation.** Jose Ermirio de Moraes. *Boletim da Associacao Brasileira de Metais,* v. 8, no. 29, Oct. 1952, p. 361-372.

Mining, exploration, processing and metal industries as economic factors in the development of Brazil. Tables. (A4)

258-A. (Russian.) **Science and Development of Soviet Metallurgy.** I. P. Bardin. *Priroda,* v. 41, no. 11, Nov. 1952, p. 11-17.

From the Soviet Revolution to present day. Photographs. 2 ref. (A general)

259-A. (Russian.) **A New Rise in Ferrous Metallurgy.** N. T. Giedtrov. *Priroda,* v. 41, no. 12, Dec. 1952, p. 62-64.

Developments in the Soviet Union during 1952. (A general, Fe)

260-A. (French.) **Importance and Economic Role in the Recovery of Nonferrous Metals.** *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 515, 517-518, 527. (A4)

261-A. (German.) **Problems of European Integration.** H. Falk. *Metall,* v. 7, nos. 11/12, June 1953, p. 453-455.

Problems from standpoint of nonferrous metals industry. (A4, EG-a)

262-A. (German.) **Nonferrous Metals Convention, 1953.** H. Sennekamp. *Metall,* v. 7, nos. 11/12, June 1953, p. 456-458.

Position and development of nonferrous metals industry of West Germay. (A4, EG-a)

263-A. (German.) **Status of Nonferrous Metals in West Germany With Regard to Changing World Market Conditions.** *Metall,* v. 7, nos. 11/12, June 1953, p. 459-464.

Trend of metals prices; international conference on raw materials; status of Cu, Pb, Zn, Sn and Al; mining and metallurgy problems; and exports and imports. (A4, Cu, Pb, Zn, Sn, Al)

264-A. (German.) **Mystery-Shrouded 5th August 1953.** O. Schultze. *Metall,* v. 7, nos. 11/12, June 1953, p. 465-469.
States that Britain will decontrol Cu and links this occurrence with similar moves in Sn, Pb, Zn and Cu relative to national and international markets. (A4, Sn, Pb, Zn, Cu)

265-A. (German.) **Metals Marketers Convene in Baden-Baden.** H. Schroeder. *Metall,* v. 7, nos. 11/12, June 1953, p. 470-472.
Position of convention toward liquidity, sales taxes, investment credits, foreign markets, and cartel laws. (A4)

266-A. (German.) **Transactions of the Electrochemical Industry.** *Metall,* v. 7, nos. 11/12, June 1953, p. 473-476.
Balance sheets, financial needs, changes in activity, profit statements and dividends. Tables. (A4)

267-A. (German.) **Metals at the Trade Fair, Hannover, 1953.** F. Reidemeister. *Metall,* v. 7, nos. 11/12, June 1953, p. 481-485.
Semifabrication works and foundries; electrotechnical industry; construction of machines and equipment; and metal wares, fixtures and other devices. (A general)

268-A. (German.) **Metals Mirror.** *Metall,* v. 7, nos. 11/12, June 1953, p. 485-486.
Political overtones from Britain's decontrol of Cu; debates whether Inco's monopoly on Ni will end. (A4, Cu, Ni)

269-A. (German.) **Metals Abroad.** *Metall,* v. 7, nos. 11/12, June 1953, p. 487-489.
Metals markets relative to Cu, Zn, Pb, Sn, Al and the noble metals. (A4, Cu, Zn, Pb, Al, Sn, EG-c)

270-A. (German.) **Metals Market.** *Metall,* v. 7, nos. 11/12, June 1953, p. 490-491.
Position of Cu, Zn, Pb, Sn, and Al in West German metals market. (A4, Cu, Zn, Pb, Sn, Al)

271-A. (German.) **Metals Markets.** *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 6, June 1953, p. 241-242.
Touches on a free Cu market, decreased Pb and Zn tariffs of USA, further depression in Sn and Al market. (A4, Cu, Pb, Zn, Sn, Al)

272-A. Activities of the Institute. George S. Rose. *American Iron and Steel Institute,* New York, May 1953, 34 p.
A report of 1952 activities explaining and relating the work of the Institute and its committees. (A general)

273-A. Some Economic Aspects of the European Steel Industry. Michael J. Layton. *American Iron and Steel Institute,* New York, May 1953, 19 p.
Future demand for steel in western Europe and their capacity to meet that demand. Table. (A4, ST)

274-A. (French.) **Management and Organization of Metallurgical Enterprises.** Pierre Lamy. *Métallurgie et la Construction Mécanique,* v. 85, no. 1, Jan. 1953, p. 61, 63, 65, 67; no. 2, Feb. 1953, p. 83-85, 87; no. 3, Mar. 1953, p. 219, 221, 223; no. 5, May 1953, p. 339-340, 343.
Part I: Problem of obtaining supplies. Part II: Production sections, recording of work, and planning. Part III: Functions of the commercial service, its "tools", and its relations to manufacturing and bookkeeping. Part IV: Role and function of the board of directors and various administrative groups. (A4, A5, A6)

275-A. (Book.) **Metal Statistics.** Ed. 46. 872 p. 1953. American Metal Market, 18 Cliff St., New York, N. Y. $2.50.
Statistical information on ferrous and nonferrous metals, and miscellaneous economic subjects. (A4)

276-A. (Pamphlet.) **Industrial Research and Development.** U. S. Bureau of Labor Statistics, Washington, D. C., Jan. 1953, 42 p.
Preliminary report on nationwide survey of companies engaged in scientific and engineering research and development conducted in mid-1952. Tables, graphs. (A9)

277-A. The Outlook for Galvanized Sheet Steel in 1953. B. P. Finkbone. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 21-30. (A4, CN)

278-A. Zinc. A European Survey. R. Lewis Stubbs. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 66-84.
Development of the industry, features of European production, consumption and trends. Graphs. (A4, Zn)

279-A. World Situation in Zinc. S. D. Strauss. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 90-99.
Market trends. Graph, table. (A4, Zn)

280-A. United States Slab Zinc Supply and Consumption in 1953. Howard L. Young. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 103-109. (A4, Zn)

281-A. Ion Exchange Process for Recovery of Gold From Cyanide Solution. F. H. Burstall, P. J. Forrest, N. F. Kember, and R. A. Wells. *In-*

dustrial and Engineering Chemistry, v. 45, Aug. 1953, p. 1648-1658.

Stepwise process for separating Au and Ag from other heavy metals. Tables, diagrams, graphs. 8 ref. (A8, Au, Ag)

282-A. Industrial Research as a Tool of Industry. S. L. Hoyt. *Metal Progress,* v. 64, July 1953, p. 75-78.

History, importance and uses of industrial research. (A9)

283-A. Pravda Reports on Russia's Progress in Ferrous Metallurgy. *Metal Progress,* v. 64, Aug. 1953, p. 125-128.

Digest of "The Important Tasks of Technical Progress in Ferrous Metallurgy", by I. P. Bardin, *Pravda,* May 27, 1953. Achievements of Russian iron and steel industry between 1940 and 1951. (A general, Fe)

284-A. (Czechoslovakian.) **Classification of Scrap Metal.** Jaroslav Malkovsky. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 398-401.

Method of classifying Cu and Cu alloy scrap. Tables, diagrams. 5 ref. (A8, Cu)

285-A. (German.) **Economics of Lead in South America.** Walter Gehr. *Metall,* v. 7, nos. 13-14, July 1953, p. 560-561.

Figures on reserves and industry of Pb in various South American countries. Tables. (A4, Pb)

286-A. (German.) **Iron-Producing Industry in Soviet East Germany.** *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1135-1140.

Development of the industry since the end of the war and its status at the present time. Compares present status with conditions at the beginning of the 1951-55 five-year plan. Tables. 2 ref. (A4, Fe)

287-A. (English.) **Brief Outline of Steel Industries in Some Latin-American Countries.** Bogota Conference, Oct. 13-Nov. 5, 1952, ST/ECLA/-CONF. no. 1/L.O, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.

Brief outline of existing iron and steel industries and resources in seven Latin American countries. Tables, maps. (A4, B10, Fe, ST)

288-A. (English.) **The Balance of Materials and the Economic Comparison of the Different Steel Making Processes.** E. Krebs. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.56, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.

Compares the operational economy of various steelmaking processes. Tables, diagrams, graphs. (A4, D general, ST)

289-A. (English.) **Comparative Investment Costs for Different Steelmaking Processes.** C. F. Ramseyer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.53, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.

A study of the relative capital investments required to make steel by different processes. Tables. (A4, D general, ST)

290-A. (English.) **Factors Influencing Iron and Steel Consumption in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.86, 1952, 60 p. Published jointly by ECLA-TAA for United Nations.

General trends in the total demand for iron and steel products in six Latin American countries. Tables, graphs. (A4, ST)

291-A. (English.) **Influence of Local Factors on the Iron and Steel Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/-ECLA/CONF. no. 1/L.87, 1952, 58 p. Published jointly by ECLA-TAA for United Nations.

Influence of all factors relating to geography, raw materials and wage rates on costs and investments. Tables. (A4, A5, ST)

292-A. (English.) **Influence of the Size of the Markets on the Iron and Steel Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.91, 1952, 36 p. Published jointly by ECLA-TAA for United Nations.

Influence of size of markets on costs and investments. Tables, graphs. (A4, ST)

293-A. (English.) **Preliminary Information Regarding Costs of Several Factors of Interest to the Iron and Steel Industry.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.89, 1952, 10 p. Published jointly by ECLA-TAA for United Nations.

Compilation of data dealing with the cost of important factors in the development of iron and steel industry. Tables. (A4, ST)

294-A. (English.) **Selection of Steelmaking Processes and of Locations for Integrated Iron and Steel Works.** Wm. A. Haven. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.52, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.

Considerations and circumstances leading to establishment of plants

in Brazil and Colombia. Tables, maps. (A4, D general, B10, ST)

295-A. (English.) **Some Aspects of Labor Problems in the Iron and Steel Industry. I. Industrialization and Social Policy. II. The Work of the International Labor Organization in the Iron and Steel Industry. III. Conclusions of the Iron and Steel Committee Regarding Problems in the Iron and Steel Industry. IV. Future Prospects.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.81, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

(A5, ST)

296-A. (English.) **Some Suggestions for Increasing the Iron and Steel Industry in Latin America.** Pablo Sada. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.84, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Brief history of a steel plant built under difficult conditions. Outstanding results achieved. Tables. (A5, ST)

297-A. (English.) **Structure of the Steel Transforming Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.88, 1952, 63 p. Published jointly by ECLA-TAA for United Nations.

Preliminary economic data on the role played by iron and steel industries in the economics of certain Latin American countries. Tables. (A4, ST)

298-A. (English, French.) **Notes on the Ugine-Sejournet Extrusion Process.** J. Sejournet. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.68, 1952, 9 p. Published jointly by ECLA-TAA for United Nations.

New techniques in the extrusion process. Presents hourly rate and production costs. (A4, F24)

299-A. (English, Spanish.) **Consumption of Iron and Steel Products in Mexico.** Marcelo G. Aramburu. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.83, 1952, 50 p. Published jointly by ECLA-TAA for United Nations.

Production, consumption, imports, exports and markets. Tables, graphs. (A4, ST)

300-A. **Swarf Recovery.** E. R. Thews. *Metal Progress,* v. 64, Sept. 1953, p. 194.

Condensed from "Metallurgical Treatment of Swarf", *Metal Industry,* Dec. 21, 1952, p. 521; Dec. 28, 1952, p. 535; Jan. 4, 1953, p. 7. Recovery processes for nonferrous scrap metal. (A8, EG-a)

301-A. (Pamphlet.) **Annual Report of the Board of Directors.** American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 1953, 48 p.

Complete annual report on the activities of the ASTM. (A9)

302-A. (Book.) **Dust in Industry.** 175 p. 1948. Society of Chemical Industry, 56, Victoria St., London S.W.1. $2.20.

Papers read at the Conference at Leeds, Sept. 28-30, 1948. Discusses dust problems in metal, chemical, and textile industries as well as explosion problems. (A7, A5)

303-A. (Book.) **Metal Industry Handbook and Directory.** 465 p. 1953. Louis Cassier Co., Ltd., Dorset House, Stamford St., London S.E.1, England. Available only with weekly journal *Metal Industry* at combined subscription of $7.45.

Annual edition covers properties of nonferrous metals. Includes summaries of British Standard, Aircraft Material and D.T.D. specifications, and metal finishing processes. (A10, S22, L general)

304-A. (Book.) **Quin's Metal Handbook.** K. V. Henderson, editor. Ed. 39. 752 p. 1952. Metal Information Bureau, Ltd., Princes House, 39 Jermyn St., London S.W.1, England. (Available from Technical Bookshop of *Mining Magazine,* 482, Salisbury House, London E.C.2.) 25s.

Statistical data, definitions, and general review of metalworking. (A general)

305-A. (Book—German.) Klingelnberg, Technical Handbook.) **Klingelnberg, Technisches Hilfsbuch.** Rev. ed. 13. Walter Krumme and Rudolf Reindl. 890 p. 1953. Verlag Stahleisen m. b.H., Postfach 2590, Düsseldorf, Germany. 19.80 DM.

Mathematics; measures and units; materials; metal protection; precision measurements; elements of machines; standard coefficients and standard revolutions; and organizational shop questions. (A general, S22)

306-A. (Book—English, Spanish, French.) **Expert Working Group on Iron and Steel Industry in Latin America.** Bogota Conference, Bogota, Colombia, Oct. 13-Nov. 5, 1952. Economic Commission for Latin American and Technical Assistance Administration. United Nations Secretariat, New York City.

Sixty-four individual papers concerning fuels, technical problems, and economic factors relating to iron and steel production. (A4, B10, D general, Fe, ST)

307-A. Controlled Heating and Air Conditioning in the Manufacture of Metal Products. Leo Walter. *Machinery (London),* v. 83, Sept. 25, 1953, p. 619-622.

Diagrams, photographs. 6 ref. (A5)

308-A. Titanium Metallurgy. Hugh E. Voress, compiler. U. S. Atomic Energy Commission, TID-3039, Apr. 14, 1953, 57 p.

Bibliography of unclassified report literature containing 366 references. Includes author, subject and numerical indexes. (A10, Ti)

309-A. (German.) **Slagging of Cobalt From Cobalt-Containing Copper Melts.** Friedrich Johannsen and Klaus Emicke. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 9, Sept. 1953, p. 341-348.

Concentrating Co in slag by slightly oxidizing the melt. Tables, graphs. 10 ref. (A8, Co, Cu)

310-A. Condensed Review of Some Recently Developed Materials. *Machinery,* v. 60, Oct. 1953, p. 169-187.

Tabular information on material, trade name, properties, applications and names and addresses of manufacturers of products. (A10)

311-A. Current Research on Heat Resistant Cast Alloys as Related to Nickel Conservation. Ernest A. Schoefer. *Industrial Heating,* v. 20, Oct. 1953, p. 1973, 1974, 1976, 1978, 1980, 1982, 2108-2113.

From an examination of past and present trends, predicts a nickel scarcity in future. Photographs, diagrams, graphs, tables. 3 ref. (A4, Ni)

312-A. Elimination of Defects in Metallurgical Plant. J. S. Caswell. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 7-15.

Correct and efficient design of plant and machine parts; methods of experimental stress analysis; plant manufacture and erection; and operatives and plant operation. Photographs, diagrams. 6 ref. (A5, S general, Q25)

313-A. Safe Handling Practices With Magnesium. Neil Flammer. *Modern Metals,* v. 9, Oct. 1953, p. 35-36.

Magnesium and its alloys can be processed as safely as other commercial metals by following accepted methods. Procedures for foundries, heat treating installations and machine shops. Photograph, diagram. (A7, Mg)

314-A. (German.) **World Reserves and Production of Manganese Ores.** W. Gehr. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 729-738.

Data on ore classification, mineralogy, world reserves, markets, evaluation of ores, deposits and production in Europe, Russia, Asia, Africa, the Americas and Australia. Tables. 11 refs. (A4, B10, Mn)

315-A. (Hungarian.) **Processing of Tombac-Covered Iron-Plate Scrap by Electrolysis in Sodium Cyanide Solution.** Tibor Nagy. *Aluminium (Budapest),* v. 5, no. 6, June 1953, p. 134-143.

Process and equipment for removal of brass plate. Tables, graphs. (A8, CN)

316-A. Steel Fabricating Plant. *Machinery Lloyd (Overseas Ed.),* v. 25, Oct. 10, 1953, p. 107-109.

Equipment, plant layout and operating procedure. Photographs. (A5, F general, G general, ST)

317-A. (Book.) **Materials Handling Equipment and Methods in the U.S.A. Organization for European Economic Co-Operation.** 1953. 170 p. H.M. Stationery Office, London, England. 9s.

Construction and operation of conveyers, cranes, elevators, and other equipment. Examples of efficient handling organizations and procedures. (A5)

318-A. (Book.) **Metallurgical Dictionary.** J. G. Henderson and J. M. Bates. 396 p. 1953. Reinhold Publishing Corp. 330 W. 42nd st., New York 36, N. Y. $8.50.

Includes over 5000 informative definitions and descriptions covering all the most essential terms in both production and physical metallurgy. Designed as a source of information for scientists, engineers, technicians, specification writers, purchasing agents, architects, and builders. (A10)

SECTION B

RAW MATERIALS and ORE PREPARATION

1-B. Fused Stabilized Zirconia Refractories. Douglas W. Marshall and O. J. Whittemore, Jr. *Chemistry in Canada,* v. 4, Nov. 1952, p. 23-28.

Uses for these refractories include linings for furnaces operating to 2500° C., setters for firing titanates, containers for steel and Pt, and resistors for oxide-resistor furnaces. Before development of this process, extensive use of Zr as a refractory had been limited by its high cost. Graphs and diagrams. 13 ref. (B19)

2-B. Development of Quebec-Labrador Iron Ore. W. H. Durrell. *Iron and Steel Engineer,* v. 29, Nov. 1952, p. 87-89.

Present extent of ore fields, method of mining, and economics involved in sale and distribution. (B10, Fe)

3-B. Radioactivity in Mineral Dressing. A. M. Gaudin. *Bulletin of the Institution of Mining and Metallurgy,* Nov. 1952, *Transactions,* v. 62, part 2, 1952-53, p. 30-41.

Some of the ways in which radioactivity can serve the mineral engineer, in research, in operative control, and in development of new mineral-separating processes. (B14, S19)

4-B. Development of the Science of Grinding. L. E. Djingheuzian. *Canadian Mining and Metallurgical Bulletin,* v. 45, Nov. 1952, p. 658-663; disc., p. 663-666; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 55, 1952, p. 384-392.

Work of present-day investigators on grinding fundamentals is submitted as grinding criteria: power, total work input, Bond's work index as a measure of comparative grinding efficiencies, work index as a function of grindability, grindability as a function of "80% passing *n*-mesh". The concept of thermodynamic criteria in grinding is formulated as a mathematical law. Tables and graphs. 19 ref. (B13)

5-B. Carbide Tipped Hammers Cut Pulverizing Costs. W. E. Fawcett. *Iron Age,* v. 170, Nov. 27, 1952, p. 114-116.

Hammers of pulverizing mills last up to 100 times longer when tipped with tungsten carbide. Over-all hammer length, essential to mill efficiency, is maintained for longer periods. Costs for replacement of hammers have been reduced while maintenance downtime has been minimized. (B13, T5, C-n, W)

6-B. Production of High Manganese Slags by Selective Oxidation of Spiegeleisen. Miles B. Royer and Russell C. Buehl. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1295-1300.

High-manganese slags of low phosphorus and iron content were produced by air oxidation of high-phosphorus spiegeleisen in a basic-lined converter. Various types of slags, or synthetic manganese ore, can be made. Photographs, tables and charts. (B21, Mn)

7-B. (German.) **Problems in Sampling Ores and Concentrates.** Friedrich Marr. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Oct. 1952, p. 395-400.

The sampling problem. Methods for producing analytical samples from qualitative samples. (B11)

8-B. Supplementary Tests on Cobalt Nickel Ore From Bogota Canala, New Caledonia. J. Woodcock and H. H. Dunkin. *Commonwealth Scientific and Industrial Research Organization and Mining Department,* University of Melbourne, Investigation No. 416, Mar. 19, 1952, 5 pages.

Extended tests on extraction of Co and Ni by leaching with aqueous SO_2 solutions. Reports a precipitation test. (B14, Co, Ni)

9-B. New Acid-Leaching Section Raises Cyprus Copper Recovery by 10%. A. W. Schlechten and J. L. Bruce. *Engineering and Mining Journal,* v. 153, Dec. 1952, p. 88-91.

Process consists of leaching 2,000 long tons every 24 hr. of minus-½-in. raw Mavrovouni ore with 4% H_2SO_4 containing 2 g. per liter ferric iron, and separating leached material into sand and slime portions. Sand portion is washed in 4 countercurrent classifiers, and slime in 4 countercurrent thickeners. Plant is located on island of Cyprus in the Eastern Mediterranean. (B14, Cu)

10-B. Substitute Chromium Sources Reduce Production Costs of Stainless Steel. Norris B. McFarlane. *Journal of Metals,* v. 4, Dec. 1952, p. 1284-1285.

Melting practices have been developed whereby chromium can be obtained from stainless scrap, high-carbon ferrochrome, and chromium silicide at a substantial saving. (B22, D general, SS)

11-B. A Process for the Recovery of Manganese From Ores. Thomas Andrew Hendrickson. *Quarterly of the Colorado School of Mines,* v. 47, Jan. 1952, p. 21-43.

Process consists of transforming Mn from its original mineralogical form to water-soluble chloride form by heating in an atmosphere of dry Cl gas. Soluble manganese chloride is leached with water, precipitated from solution as manganese hydroxide and sintered to Mn_2O_3, the final product, assaying in excess of 60% Mn. Tables and graphs. 24 ref. (B14, B16, Mn)

12-B. Stepping Stones Towards Uranium Production. *South African Mining and Engineering Journal,* v. 63, Oct. 18, 1952, p. 251, 253.

A general discussion. (B10, U)

13-B. High-Temperature Experiments With Zirconium and Zirconium Compounds. W. J. Kroll, W. R. Carmody, and A. W. Schlechten. *U. S. Bureau of Mines,* Report of Investigations 4915, Nov. 1952, 31 pages.

Experiments on decomposition of zircon, direct production of Zr alloys, reaction of metals with Zr tetrachloride, and with K-Zr fluoride, plating Zr alloys on other metals by chemical methods, smooth plating of Zr by electrolysis, fusibility of Zr-Na chloride mixtures, and production of Zr metal powder by chemical methods and by fusion electrolysis. (B14, C general, L17, H10, Zr)

14-B. Maple Mountain-Hovey Mountain Manganese Project, Central District, Aroostock County, Maine. N. A. Eilertsen. *U. S. Bureau of Mines,* Report of Investigations 4921, Nov. 1952, 118 pages.

Metallurgical investigations of ore dressing, pyrometallurgical tests, acid leaching, and volatilization as chloride. Tables, and diagrams. (B14, Mn)

15-B. Testing of Prospective Iron Ores. H. U. Ross. *Canadian Mining Journal,* v. 73, Dec. 1952, p. 47-51.

Problems and tests involved in determination of ore. Blast furnace and its operation, chemical features, agglomeration, methods of beneficiation, crushing and screening, washing, jigging, heavy media sink-and-float methods, magnetic concentration and roasting, flotation, drying and calcining, and means of testing the ores. Photographs. (B13, B14, B15, D1, Fe)

16-B. Flame Radiation. G. M. Ribaud, J. E. de Graaf, O. A. Saunders, and M. W. Thring. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 221-234.

Effects of different types of fuels, fuel energy input rates, atomizing agents, air-to-fuel ratios and quantities of atomizing agents on flame radiations. (B18)

17-B. Table Flotation for the Removal of Sulphides From Tin-Wolfram Concentrates in Portugal. J. C. Allan. *Bulletin of the Institution of Mining and Metallurgy,* v. 62, Dec. 1952, p. 81-90.

General discussion. (B14, Sn, W)

18-B. Oxygen in Industrial Heating and Gasification. *Coke and Gas,* v. 14, Dec. 1952, p. 437-442.

Use of O_2 in production of iron and steel and in manufacture of various fuel gases. (B22, B18, ST)

19-B. Chuquicamata Sulphide Plant. *Mining Engineering,* v. 4, Dec. 1952, p. 1175-1212.

Anaconda Mining Co's. plant at Chuquicamata, Chile. Separate articles as follows: "General Design—Sulphide Ore Plant", Wilbur Jurden; "Crushing Section", A. P. Svenningsen; "Concentrator Design", E. F. Raffo; "Concentrator Operation", D. S. Sanders and E. W. Witcomb; "Tailing Disposal", R. M. Kuralt; "Smelter Stacks", C. W. Dunham; "Piping", J. P. Manning; "Electrical Distribution", S. F. French; "Waste Heat Power Plant", B. F. Koch; and "Water Supply", W. E. Rudolph and B. E. Baylor. (B13, B14, C21, Cu)

20-B. The Oxide Plant. E. V. Herring and J. C. Allen. *Mining Engineering,* v. 4, Dec. 1952, p. 1212-1214.

Equipment and operation of Chile

Exploration Co's. plant at Chuquicamata, Chile. (B14, Cu)

21-B. Magnetic Roasting of Lean Ores. Fred D. DeVaney. *Mining Engineering,* v. 4, Dec. 1952, p. 1219-1223.

General discussion of process developed by P. H. Royster. Charts and diagrams. (B15, Fe)

22-B. The Effect of Heat Treatment and Certain Additives on the Strength of Fired Magnetite Pellets. Strathmore R. B. Cooke and William F. Stowasser, Jr. *Mining Engineering,* v. 4, Dec. 1952, p. 1223-1230.

Factors responsible for strength of fired magnetite pellets, and effect of firing on magnetite pellets containing added CaO and MgO. Micrographs. (B16, Fe)

23-B. Effects of Alkalinity on the Flotation of Lead Minerals. Marston G. Fleming. *Mining Engineering,* v. 4, Dec. 1952, p. 1231-1236.

Fallacies of general theories of alkali depression, showing that operation depends upon nature of mineral-collector system involved. Three mechanisms of alkali depression, and limitations of critical pH as a fundamental factor in flotation. (B14, Pb)

24-B. (French.) **The Cobalt Industry in Haut-Katanga.** Georges Desbriere. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 777-782.

Processes and equipment for extraction and refining Co in the Belgian Congo, as well as economical and geographical aspects of the problem. Photographs and charts. (B10, B12, B14, C general, A4, Co)

25-B. White Pine Copper. R. H. Ramsey. *Engineering and Mining Journal,* v. 154, Jan. 1953, p. 72-87.

Origin of the company, its organization, mill design, plan for mining, crushing, grinding, smelting, and power. Diagrams and photographs. (B13, B14, C21, Cu)

26-B. Evaluation of the pH and Conductivity Methods of Slag Control. P. D. S. St. Pierre. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 41-43.

Shows that although pH and conductivity measurements can indicate in a general way mineralogical development of a slag as heat proceeds, nature of hydrolysis of calic minerals precludes exact quantitative measurements. Micrographs, tables, and graphs. 5 ref. (B21)

27-B. Study on Sintering of Iron Ores. I. Reducibility of Iron Oxide Materials. Yoshikazu Takahashi. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 298-310.

Briquet samples containing Fe_2O_3, SiO_2, and CaO were heated at 1200 and 1300° C. in air or mixed CO and CO_2 so that Fe oxides might occur as hematite, magnetite, or wüstite. Samples were deoxidized with CO or H_2 at 900° C., and their reducibility, expressed as a value of comparative reducibility, was determined from their own reduction curves. Relation between reducibility and porosity. Graphs and tables. 19 ref. (B16, Fe)

28-B. (German.) **New Results With Pelletizing of Iron Ore Concentrates.** Georg Sengfelder. *Stahl und Eisen,* v. 72, Dec. 4, 1952, p. 1577-1579.

Report No. 63 of the Ore Committee of the Verein Deutscher Eisenhüttenleute giving results of production runs. Results are related to properties and reducibilities of the pellets. Photographs, charts, and tables. (B16, Fe)

29-B. (Book.) **Hydrometallurgy of Base Metals.** George D. Van Arsdale. 370 pages. 1953. McGraw-Hill Book Co. Inc., 330 W. 42nd St., New York 36, N. Y. $9.50.

Chemical, metallurgical and industrial aspects of recovering nonprecious metals from their oxidized ores by leaching. Covers Cu, Pb, Zn, Ni, Co, Mn, Sn, Sb, Cd, V and U. (B14, EG-a)

30-B. Super Refractories. R. H. Warring. *Ceramics,* v. 4, Dec. 1952, p. 472-476.

Silicon carbide—applications, impingement and abrasion, and comparative costs. (B19)

31-B. Size Reduction. R. V. Riley. *Chemical & Process Engineering,* v. 34, Jan. 1953, p. 8-12, 28.

Grinding theory; operational principles; new constructional materials; crushers, disintegrators, pulverizers, ball mills and jet pulverizers; and special applications of size reduction. Photographs. 59 ref. (B13)

32-B. Tall Oil in Flotation Processes. *Chemical & Process Engineering,* v. 34, Jan. 1953, p. 13-14.

Flotation principle, flotation plants, phosphate rock flotation, Mn ore flotation, Fe ore flotation, and other minerals. 9 ref. (B14, Mn, Fe)

33-B. Cyanidation by Percolation of Battery Tailings From Haoma Lease, Mount Monger, W. A. Arnold Griffin and Evan E. Hughes. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 491, May 25, 1951, 4 pages.

(B14, Au)

34-B. Cyanidation by Percolation of Battery Tailings From Haoma Lease, Mount Monger, W. A. Supplementary Report. Allan T. Miles. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 491, Jan. 3, 1952, 5 pages.
(B14)

35-B. Flotation Tests on Tailings From Protheroe Lead Mine, Nabawa, W. A. R. L. Thomas and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 497, Nov. 27, 1951, 9 pages.
(B14, Pb)

36-B. Continuous Grinding and Filtering Test on Ore From the Copperhead Mine, Bullfinch, W. A. Allan T. Miles and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 498, Dec. 18, 1951, 3 pages.
(B13, Cu)

37-B. Uaroo Lead Mine, Onslow, Lead and Silver Determinations. R. L. Thomas and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 501, Jan. 30, 1952, 1 page.
(B14, Pb, Ag)

38-B. Tests to Determine a Method of Treatment of a Gold Ore From Yundamindera, W. A. Allan T. Mills and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 505, Jan. 2, 1952, 4 pages.
(B14, Au)

39-B. Tabling Tests on Gold-Scheelite Ore From Hannans North Gold Mines, Kalgoorlie. R. L. Thomas and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 512, Jan. 4, 1952, 2 pages.
(B14, Au)

40-B. Investigations of the Treatment of Battery Tailings at the Golden Arrow Battery, Broad Arrow, W. A. Allan T. Miles and C. H. Meharry. *Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines.* Report No. 518, Jan. 7, 1952, 6 pages.
(B14, Au)

41-B. Sedimentation Analysis of Magnetite. P. G. Meerman and H. J. Odekerken. *Fuel,* v. 32, Jan. 1953, p. 62-66.

Sedimentation analysis of magnetite can be performed using ordinary dispersing agents, such as sodium polymetaphosphate and sodium linolate, after oxidizing the greater part of the material by heating in air. Tables and micrographs.
(B14, Fe)

42-B. (English.) **Some Investigations on the Action of Weathering on Sulfide Minerals and Ores.** Sven Bergenfelt. *Jernkotorets Annaler,* v. 136, No. 10, 1952, p. 429-438.

Tests on concentrates and ores, including leaching tests and analyses of mine waters. (B14)

43-B. Refractory Properties of Pacific Northwest Chromites. H. J. Kelly, K. G. Skinner, M. E. Tyrrell, and A. W. Goring. *U. S. Bureau of Mines,* Report of Investigations 4929, Dec. 1952, 28 pages.

Objectives of investigation were to determine inherent physical and chemical characteristics, to prepare dense refractory shapes using Cr ores and concentrates, and to compare refractory qualities of laboratory-prepared shapes with commercial chrome refractories. Tables and photographs. (B19, Cr)

44-B. Formation of Dithionate and Sulfate in the Oxidation of Sulfur Dioxide by Manganese Dioxide and Air. A. E. Back, S. F. Ravitz, and K. E. Tame. *U. S. Bureau of Mines,* Report of Investigations 4931, Dec. 1952, 14 pages.

Detailed information on effects of various factors influencing formation of dithionate in leaching Mn ores with SO_2. Tables. (B14, Mn)

45-B. Metallurgical Coke. J. P. Graham, G. E. Hall and G. W. Lee. *Journal of the Institute of Fuel,* v. 25, Jan. 1953, p. 333-337.

See similar abstract from item 335-B, 1952. (B18, D1, Fe)

46-B. Iron King Uses Close Control. *Mining World,* v. 15, Feb. 1953, p. 26-29.

Beneficiation and control in mining Pb-Zn ore. (B14, Pb, Zn)

47-B. (Book.) **Iron Millionaire: Life of Charlemagne Tower.** Hal Bridges. 322 pages. Univ. of Penna. Press, 3436 Walnut St., Philadelphia 4. $4.75.

Story of one of the great early entrepreneurs, plus story of how Minnesota iron region was first explored and opened up (B10, Fe)

48-B. Reserve Mining Company Building Large Plant to Process Taconite. Charles Longenecker. *Blast Furnace and Steel Plant,* v. 41, Feb. 1953, p. 189-191.

General discussion of plant design and equipment. Photographs.
(B14, Fe)

49-B. Grinding and Crushing. *Chemical Engineering Progress,* v. 49, Feb. 1953, p. 55-72.

Includes "Fundamental Aspects of Grinding", Edgar L. Piret; "Types

of Grinding Mills and When to Use Them", Henry W. Erickson; and "Unusual Techniques in Grinding", J. Howard Foote. (B13)

50-B. New Devices, New Flowsheets Liven Iron Ore Processing. Leslie J. Bechaud, Jr. *Engineering and Mining Journal,* v. 154, Feb. 1953, p. 124-127.

New developments in use of cyclones, HMS units, magnetic separators, spirals, and classifiers. (B14, Fe)

51-B. Humboldt Iron Will Be Recovered by Flotation. D. K. Campbell and L. J. Erck. *Engineering and Mining Journal,* v 154, Feb. 1953, p. 129-131.

Developments of an open-pit mine with a plant for beneficiating iron-bearing material by froth flotation. Diagrams. (B14, Fe)

52-B. New Processes Feature Gains in Nonferrous Metallurgy. A. W. Schlechten. *Engineering and Mining Journal,* v. 154, Feb. 1953, p. 132-134, 136.

Reviews work and previous literature on Sterling process, flash roasting, hot patching of furnaces and Fluosolids roasting. Photographs. (B15)

53-B. Titanium. John Loughlin, *Light Metal Age,* Feb. 1953, p. 16-17, 20, 30-31.

Deposits and research laboratories in Australia. Diagrams. (B-10, A9, Ti)

54-B. Big New Plants Highlight Beneficiation Development. E. H. Crabtree. *Mining Engineering,* v. 5, Feb. 1953, p. 156-161.

Plant construction, increased capacity in copper plants, hydrometallurgy, and Chemico process for nonferrous metals. (B14)

55-B. A Method for Concentration of North Carolina Spodumene Ores. Mason K. Banks, William T. McDaniel, and Philip N. Sales. *Mining Engineering,* v. 5, Feb. 1953, p. 181-186.

Process was developed which produces spodumene concentrates assaying 6.0% Li_2O and 0.45% Fe_2O_3, with 70-75% recovery of spodumene. Two flotation separations are required. Simultaneous removal of mica, feldspar, and quartz as a froth product using a cationic collector; and subsequent removal of Fe-bearing minerals as a froth product while spodumene is depressed as a tailing are required. Tables. 11 ref. (B14)

56-B. Fundamentals of Foundry Refractories. J. D. Custer and J. Spotts McDowell. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 681-685; disc., p. 685-686.

Intermediate and low-duty fireclay brick, high-duty fireclay brick, superduty fireclay refractories, high alumina refractories, silica refractories, basic refractories, ganister-fireclay mixes, hydraulic setting castable refractories, and plastic fire brick. (B19, E10)

57-B. Cominco Development in Lead Sintering Technique. R. Bainbridge. *Canadian Mining and Metallurgical Bulletin,* v. 46, Feb. 1953, p. 61-66; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 56, 1953, p. 13-18.

Significant phases in development of "wet-mix" process. Its application in present operations and in design of new plant now under construction. Tables and graphs. (B16, Pb)

58-B. Milling Tungsten Ores at the Getchell Mine. Keith Kunze. *Mining Congress Journal,* v. 39, Jan. 1953, p. 31-33.

Shows that acid leach helps convert scheelite concentrate to acceptable product. (B14, W)

59-B. New Oxide Lead Unit for Darwin. J. B. Huttl. *Engineering and Mining Journal,* v. 154, Mar. 1953, p. 81-83.

Mining and milling pyritic Pb-Zn and oxidized Pb-Ag ores. (B12, B13, Pb, Zn, Ag)

60-B. New Ideas for Bagdad Copper. Ernest R. Dickie, George Green, Olaf Hondrum, and George Colville. *Engineering and Mining Journal,* v. 154, Mar. 1953, p. 88-93.

Mining techniques and ore treatment. (B12, B13, B14, Cu)

61-B. Reserve Mining Reveals Beneficiation Process. Darwyn I. Brown. *Iron Age,* v. 171, Mar. 12, 1953, p. 129-134.

Process for extracting iron from taconite ore. Photographs. (B14, Fe)

62-B. Secondary Enrichment in Bolivian Tungsten Deposits. N. N. Kohanowski. *Mines Magazine,* v. 43, Feb. 1953, p. 17-24, 51, 59.

Tungsten minerals are reviewed to bring out their lesser known peculiarities. Mutual relationships are discussed to show mechanism of secondary enrichment. Farallonite is described. Diagrams. (B10, W)

63-B. Electrical and Metallurgical Improvements at Kennecott's Utah Copper Division Mills. R. J. Corfield and A. G. Johnson. *Mining Engineering,* v. 5, Mar. 1953, p. 274-276.

Improvements in power distribution, flotation motors, and Mo recovery. Photographs. (B14, Mo)

64-B. (Pamphlet.) **Cyanidation by Percolation of Tailings Lying on Tailings Area 11 and Machinery Area 12 at Kundip, W. A.** Evan E. Hughes and

C. H. Meharry. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 472, Sept. 17, 1951, 3 pages.

Laboratory study using Au and Cu ores. Tabulated data. (B14, Au, Cu)

65-B. A Simple Formula for Evaluating Iron Ores. Francis H. Crockard. *Blast Furnace and Steel Plant,* v. 41, Mar. 1953, p. 295-301.

Formula gives values based on Fe content alone that is useful in broad general terms. (B11, Fe)

66-B. Heat Hardening of Pellets Made From Taconite Concentrates. G. V. Woody. *Blast Furnace and Steel Plant,* v. 41, Mar. 1953, p. 314-317.

Type of equipment in operation at pilot plant. Diagrams. (B16, Fe)

67-B. Sampling and Testing of Sinter. R. L. Stephenson and D. J. Carney. *Mining Engineering,* v. 5, Mar. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 196, 1953, p. 309-311.

Describes sampling technique developed for procuring a sample of sinter representative of entire depth of sintering bed. Additional data were obtained to indicate that the tumbler test is a suitable means of measuring sinter strength. Photographs and graphs. (B11, B16)

68-B. The Magnetic Reflux Classifier. Lawrence A. Roe. *Mining Engineering,* v. 5, Mar. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 196, 1953, p. 312-315.

Apparatus which utilizes combined effects of magnetic fields and a hindered settling classifier is used to determine quantity and quality of middlings in fine-sized magnetite concentrates. Results are given for processing a typical taconite ore. Sketch of apparatus. Tables. (B14, Fe)

69-B. (French.) **Conducting and Controlling the Operation of Steel Mill Gas Generators.** P. Devilder. *La Métallurgie et la Construction Mécanique.* v. 85, Jan. 1953, p. 47, 49, 51, 53.

General discussion. Includes schematic drawings (B18)

70-B. New Ways to Metals. *Fortune,* v. 47, Apr. 1953, p. 152-157, 208, 211-212, 214, 216.

New ore dressing and extractive processes. (B general, C general)

71-B. Low Grade Ores. J. D. Sullivan and S. F. Ravitz. *Machinery Lloyd* (Overseas Ed.), v. 25, Mar. 28, 1953, p. 71, 73, 75, 77-79.

Review of some changes in economically usable grades of ores and of some outstanding recent technical developments for employing low-grade ores, including byproduct utilization. Considers Fe, Al, Mn, and W ores. (B general, Fe, Al, Mn, W)

72-B. More Ferro-Alloys for Hungry Furnaces. *Steel Horizons,* v. 15, no. 1, 1953, p. 24-25.

Production expected from new plant in Marietta, Ohio. Photographs. (B22, Fe)

73-B. Processes for Beneficiating Great Gossan Lead Ores, Carroll County, Va. James S. Browning and Clinton B. Clevenger. *U. S. Bureau of Mines,* Report of Investigations 4945, Feb. 1953, 14 pages.

Technical feasibility of recovering the associated Cu, Pb, and Zn from pyrrhotite ore. Small-scale preliminary studies. (B14, Pb, Cu, Zn)

74-B. Hermada Antimony Deposit, Elmore County, Idaho. Constantine C. Popoff. *U. S. Bureau of Mines,* Report of Investigations 4950, Feb. 1953, 21 pages.

Physical features and geology. Field work done by Bureau of Mines emphasizing ore flotation and tailing tests. (B10, B14, Sb)

75-B. Ore-Dressing Tests of Aroostook County, Maine, Manganese Ores. Frank D. Lamb, W. E. Warnke, and D. A. Woodard. *U. S. Bureau of Mines,* Report of Investigations 4951, Feb. 1953, 10 pages.

Gravity concentration, roasting, magnetic separation, and flotation. Tabulated data. (B14, Mn)

76-B. Preliminary Tests of Nevada Oxidized Copper Ores. A. L. Engel. *U. S. Bureau of Mines,* Report of Investigations 4952, Feb. 1953, 6 pages.

Tests confined for the most part to laboratory-scale acid leaching for Cu extraction. (B14, Cu)

77-B. (German.) **Suggestions for Increasing Efficiency of Industrial Coking Furnaces.** Franz Trefny. *Brennstoff-Chemie,* v. 34, Feb. 1953, p. 45-51.

Measures include increasing coal charge and improving quality of degassing product. Charts. 70 ref. (B18)

78-B. (German.) **Recent Work on Preparation of Improved Blast Furnace Coke.** C. Abramski. *Brennstoff-Chemie,* v. 34, Feb. 1953, p. 51-55.

Various grinding and selection methods used in German industry. (B18, D1)

79-B. (Book.) **Minerals—a Key to Soviet Power.** Demitri B. Shimkin. 452 pages. Harvard University Press, Cambridge 38, Mass. $8.

Systematic survey of mineral resources and their production and consumption by the Soviets. Deals with ferrous and nonferrous metals, gold, fuels, and nonmetallics. Problems of adequacy of Soviet production and reserves as related to economic growth and potentialities for self-sufficiency to 1970. (B10)

80-B. (Book—Russian.) **Hydrometallurgy.** E. N. Plaksin and D. M. Iuktanov. 732 pages. 1949. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Official U.S.S.R. summary of ore dressing and hydrometallurgical field. Includes detailed flow sheets. (B14)

81-B. Pilot Cyclone Plant Paves Way for Two Full-Scale Operations. W. R. Van Slyke and R. A. Derby. *Engineering and Mining Journal,* v. 154, Apr. 1953, p. 88-94.

Difficulties and problems of heavy-density separation of Fe ores. Photographs. (B14, Fe)

82-B. Kaiser Steel Production Record Set by Coke and Blast Furnace Practice. W. C. Rueckel. *Journal of Metals,* v. 5, Apr. 1953, p. 509-514.

Furnace design; coke and coal research; blast furnace practice; stocking and reclaiming; ore sizing; and sinter practice. Graphs and diagrams. (B general, D1, ST)

83-B. Beneficiation of East Texas Iron Ores Basis of Lone Star Steel Operations. W. R. Bond. *Journal of Metals,* v. 5, Apr. 1953, p. 515-519.

Concentration and beneficiation problems. (B14)

84-B. Kinetics of the Oxidation of Galena in Sodium Hydroxide Solutions Under Oxygen Pressure. J. E. Andersen, J. Halpern, and C. S. Samis. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 554-558.

Study made of the kinetics of the reaction in which the effect of temperature, O_2 pressure, NaOH concentration, and agitation were determined. Discusses results in terms of possible mechanisms for the reaction. Graphs. 9 ref. (B14, Pb)

85-B. Domestic Chrome and Manganese Ores Can Be Upgraded and Utilized. H. A. Doerner. *Mining Engineering,* v. 5, Apr. 1953, p. 385-386.

Present situation for obtaining ferro-alloys. (B10, Cr, Mn)

86-B. Upgrading Domestic Manganese Ores by Leaching With Caustic Soda. R. V. Lundquist. *Mining Engineering,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 196, 1953, p. 413-417.

Leaching Mn-bearing materials with NaOH to remove caustic-soluble SiO_2 was demonstrated as a method for upgrading Mn. Spent leach liquors are regenerated by treatment with lime to precipitate $CaSiO_3$ and to reactivate the NaOH for leaching. Tables. (B14, Mn)

87-B. Double-Bond Reactivity of Oleic Acid During Flotation. A. M. Gaudin and R. E. Cole. *Mining Engineering,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 196, 1953, p. 418.

Results of investigation to determine change in fatty acid molecule or ion during flotation. (B14)

88-B. Thorium and Its Sources in the Western Hemisphere. A. J. Strod. *American Ceramic Society Bulletin,* v. 32, Apr. 1953, p. 122-123.

Raw material resources of Th and technology of extraction of thoria from complex and rare earth minerals. Location and history of development of principal monazite deposits. (B10, Th)

89-B. Technology Increases Mineral Reserves. A. C. Richardson. *Battelle Technical Review,* v. 2, May 1953, p. 50-53.

How improved techniques extract minerals more efficiently and economically. (B general)

90-B. The Coke Evaluation Program in Operation. B. P. Mulcahy. *Blast Furnace and Steel Plant,* v. 41, Apr. 1953, p. 408-412.

Seven tests to measure essential properties of coke. (B18)

91-B. Coal Blending Plant at a Steel Works. *Engineer,* v. 195, Apr. 10, 1953, p. 525-526.

Blending plant designed to overcome the difficulty of maintaining a required coal specification for coke-oven feed with a number of coals of widely varying coking characteristics. Photographs. (B18)

92-B. Frothing Characteristics of Cresylic Acids in Flotation. Shiou-Chuan Sun. *Institution of Mining and Metallurgy, Bulletin,* Apr. 1953, *Transactions,* v. 62, pt. 7, 1952-1953, p. 301-320.

Study of the frothability of different grades of cresylic acid and individual constituents under various conditions. Tables and graphs. 10 ref. (B14)

93-B. Adjustable Voltage Ore Bridge Drive at Otis Works. E. C. Juhnke and Clark B. Risler. *Iron and Steel*

Engineer, v. 30, Apr. 1953, p. 87-92; disc., p. 92-96.

Shows that adjustable voltage drives give smooth, rapid acceleration and excellent maneuverability to ore bridge operation. Photographs and graphs. (B general, A5, ST)

94-B. Treatment Plant Operation at Giant Yellowknife. K. C. Grogan. *Canadian Mining and Metallurgical Bulletin,* v. 46, Apr. 1953, p. 210-221.

Design, equipment, and construction of plant for the recovery of free gold. Tables and photographs. (B14, Au)

95-B. Developments in Milling Practice in Southeast Missouri. Norman A. Stockett. *Mining Congress Journal,* v. 39, Apr. 1953, p. 84-87.

Milling of Pb ores. Photographs. (B13, Pb)

96-B. (Book.) **The Physical Chemistry of Melts.** 106 pages. 1952. The Institution of Mining and Metallurgy, Salisbury House, London, E.C.2, England. 15s.

Papers given at a Symposium on the "Nature of Molten Slags and Salts", Feb. 20, 1952. Includes "The Constitution of Liquid Silicates", J. O'M. Bockris; "Some Aspects of the Constitution of Liquid Oxides", J. W. Tomlinson; "Anomalies in Surface Tension of Silicates", T. B. King; "The Correlation Between Activity and Composition in Mixtures of Fused Salts", H. Flood, T. Forland, and K. Grjotheim; "Heats of Mixing in the System Ferrous Oxide-Silica in the Liquid State", M. Rey; and "Thermodynamic Aspects of Molten Slags", F. D. Richardson. (B21, P12)

97-B. Effect of Molten Aluminum on Alumina-Silica Refractories. K. J. Brondyke. *American Ceramic Society, Journal,* v. 36, May 1953, p. 171-174.

All commercial alumina-silica refractories were found to be wetted and subsequently penetrated on exposure to molten Al. Shows that penetration and Si pickup by Al was independent of porosity, grade of refractory, and source of refractory material. Graphs. (B19, C21)

98-B. Self-Fluxing Sinter. John Poast. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 101-106; disc., p. 106-110.

Investigation on production and use of self-fluxing sinters from Lake Superior ores. Tables. (B16, Fe)

99-B. The Value of Test Ovens in a Program of Coal and Coke Research. C. L. Potter. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 159-173; disc., p. 173-177.

Presents data from three test ovens to demonstrate how proper use of test-oven results can be of material value to the byproduct coking industry and shed some light on the fundamental processes of carbonization. Graphs, tables, photographs. (B18)

100-B. The Overall Efficiency of Coal Washing. J. D. Price. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 190-198; disc., p. 198-201.

Over-all economic efficiency of the complete cycle of mining, preparing, and utilization of coal. Graphs, tables. (B18)

101-B. A Greenawalt Sintering Plant. J. A. Poll. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 214-221; disc., p. 221-228.

Plant to agglomerate magnetite concentrate. Photographs. (B16, Fe)

102-B. A Practical Application of Ore Sizing. William R. Kerr. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 229-236; disc., p. 237-241.

How to prepare and beneficiate variable, dense magnetite ore containing a relatively high percentage of S so that it could be reduced efficiently in the furnace and produce suitable hot metal for openhearth. Graphs, tables. (B12, D1, Fe)

103-B. Uranium Soars to Prominence in South Africa's Gold Fields. *Engineering and Mining Journal,* v. 154, May 1953, p. 72-76.

Geologic distribution of U, mining company activities, H_2SO_4 production, leaching and precipitation plants, and capital expenditures. Photographs. (B10, U)

104-B. Slime Coatings. How to Explain and Control Them. Adrian C. Dorenfeld. *Engineering and Mining Journal,* v. 154, May 1953, p. 87-91.

Investigation of $BaSO_4$, $SrSO_4$, $CaSO_4$, $PbSO_4$, and $PbCO_3$ slimes on galena, pyrite, and syphalerite. Micrographs and tables. (B14, Pb, Fe, Zn)

105-B. Beneficiation of Low Grade Chrome Ore From Arsekere, Mysore. S. K. Banerjee and P. I. A. Narayanan. *Journal of Scientific & Industrial Research,* v. 12A, Mar. 1953, p. 136-138.

Investigation to improve low-grade ore to about 48% Cr_2O_3 which is desirable for marketing purposes. Tables. (B14, Cr)

106-B. Iron Ore Preparation. Operations Prior to Blast Furnace Smelting. D. D. Howat. *Mine and Quarry En-*

gineering, v. 19, May 1953, p. 144-149.
Beneficiation operations, crushing, secondary crushing, drying, calcining, bedding and reclaiming of ores; and agglomeration of fines. Photographs. (B13, B14, Fe)

107-B. Tennessee Copper Explores Use of Rock Grinding Media. F. M. Lewis. *Mining Engineering,* v. 5, May 1953, p. 491.
Results of tests on marble grinding media. (B13)

108-B. How Humphreys Spiral Concentrator Is Used in Modern Ore Dressing Practice. Judson S. Hubbard, I. B. Humphreys, and Whitman E. Brown. *Mining World,* v. 15, May 1953, p. 40-45.
How different companies utilize the spiral concentrator. Photographs, diagrams. (B14)

109-B. Eagle Mt. Iron Mine Expansion. *Mining World,* v. 15, May 1953, p. 53-54.
New plant and equipment for ore beneficiation. (B14, Fe)

110-B. Nodulizing. N. V. S. Knibbs and E. G. S. Thyer. *Pit and Quarry,* v. 45, May 1953, p. 114, 120, 122-123.
The process and its advantages, applications and commercial use of nodulizing finely-divided materials in processing ores and minerals. (B16)

111-B. (German.) **Granulation of Pig Iron in the Iron and Steel Works of Watenstedt.** Fritz Albrecht. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 335-337.
Type, importance, and applicability of granulated pig iron. Pilot and production plants and their methods of operation. Diagrams. (B22, CI)

112-B. Screen Analyses and Gravity Concentration of Tin Ore From Greenbushes, W. A. Evan E. Hughes and C. H. Meharry. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 485, Apr. 24, 1952, 3 p.
Tests on coarse lateritic material. (B13, B14, Sn)

113-B. Production of a Sulphide Concentrate From Ore and Mill Tailings from Hill 50 Gold Mine (N. L.), Mount Magnet, W. A. Arnold Griffin and Evan E. Hughes. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 489, May 28, 1951, 10 p.
Series of tests made to determine possibility of producing a sulphide concentrate suitable for acid manufacture. (B general, B22, Au)

114-B. Concentration of Gold Ore From the Mother Lode Mine, Ravenswood, Queensland. K. S. Blaskett and H. H. Dunkin. Commonwealth Scientific and Industrial Research Organization and the Univ. of Melbourne, Investigation 404, Oct. 26, 1951, 5 p.
Tests made to determine the best method for recovering Au. (B14, Au)

115-B. (German.) **Effect of O_2 on Sulfide Ores at Raised Pressure.** Herbert Neuhaus and Franz Pawlek. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 2, Feb. 1953, p. 41-44.
Reaction mechanism of sulfatizing roasting, treatment of pulverized heavy metal sulfides with O_2 at 300° C., leaching with H_2O or dilute H_2SO_4. Research results on solubility of Fe, Zn, galena, and other complex sulfides are included. (B14, B15, Zn)

116-B. (Book—German.) **(Methods of Ore Preparation.) Leitfaden der Erzaufbereitung.** Gerth, Salzmann, and Hamann. 239 pages. 1952. Verlag Bonner Universitäts-Buchdruckerei. Gebr. Scheur GmbH., Bonn, Germany.
Chapters on crushing, classification, sorting, siderite roasting, water supply, ore dressing systems, and dust-control measures. (B13, B14, B15)

117-B. Improving Stainless Steel. *Business Week,* June 6, 1953, p. 92, 97-98.
Describes purification of Nb, Mn, and Cr for addition to steel. Photographs. (D22, SS)

118-B. Rare Earths in Stainless Brought Up to Date. *Iron Age,* v. 171, June 4, 1953, p. 148-149.
Summary of AISI paper, "Use of Rare Earth Metals and Compounds in Stainless Steel Melting" by C. P. Post and H. O. Beaver. Briefly describes effects. (B22, D general, SS, EG-g)

119-B. Progress in Mineral Dressing. F. B. Michell. *Mining Journal* (London), Annual Review, May 1953, p. 81, 83, 85, 87, 89, 91.
Developments in crushing, screening, washing, scrubbing, grinding, classification, gravity concentration, flotation, separation, and mechanical picking. Considers Pb, Zn, Sn, and W. (B13, B14, Pb, Zn, Sn, W)

120-B. Contribution to the Theory of Milling Processes. K. Sedlatschek and L. Bass. *Powder Metallurgy Bulletin,* v. 6, May 1953, p. 148-153.
Mathematical theory of ball milling processes in which empirical

elements are eliminated and the limits of applicability can be stated *a priori;* weight-percentages of the fractions are considered as a function of the milling time; and initial particle size distribution is taken into consideration. (B13)

121-B. The Reduction-Oxidation Process for the Treatment of Taconites. F. M. Stephens, Jr., Benny Langston, and A. C. Richardson. *Journal of Metals,* v. 5, June 1953, p. 780-785.

New process for the treatment of oxidized taconites which requires no external heat and has a recovery of Fe units of 92 to 96% in magnetic form. This recovery plus increased grindability of the processed ore indicates that the method will be economically attractive. Tables. (B13, B14, Fe)

122-B. Blasted Bales Give up Secrets. *Steel,* v. 132, June 8, 1953, p. 97-98.

Use of dynamite for checking interior quality of purchased scrap bales. (B22)

123-B. (German.) **White Lead Ore Flotation.** W. Gründer and M. Dulovic. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 3, Mar. 1953, p. 99-103.

Continues Petersen's work on flotation of waste sands containing white Pb ore. Adds to Engel's report on flotation possibilities of oxide Pb ores of Nevada's Diamond District. (B14, Pb)

124-B. (German.) **Effect of Coring Phenomena on Metal-Slag Equilibria.** Willy Oelsen, Eberhard Schürmann, and Helmut Maetz. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 4, Apr. 1953, p. 128-137.

Test results from Cu and Al-containing Fe melts and Fe-Cu-Al sulfide melts. Tables, graphs. 39 ref. (B21, Fe, Cu, Al)

125-B. (German.) **Comparison of Fluorspar Dressing in Germany With That in North America.** Willy K. Finn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 4, Apr. 1953, p. 137-138.

Feasibility of electrostatic preparation of fluorspar on a commercial scale. Tables. (B21, Ca)

126-B. Iron Ore Supply. A New Appraisal of the Outlook. H. S. Harrison. *Engineering and Mining Journal,* v. 154, June 1953, p. 80-83.

Available reserves, both domestic and foreign. (B10, Fe)

127-B. How New Leach-Float Plant Handles Greater Butte's Ore. John B. Huttl. *Engineering and Mining Journal,* v. 154, June 1953, p. 90-93.

Leach-precipitation-float technique for Cu extraction. Flowsheet. (B14, Cu)

128-B. Kaiser Aluminum Starts Shipping Jamaica Bauxite to U. S. A. *Engineering and Mining Journal,* v. 154, June 1953, p. 96-98.

Description. Photographs. (B10, Al)

129-B. The Chemical Constitution of Sinters. R. Wild. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 131-135.

Chemical constitutions of a number of commercial sinters and of sinters produced in the B.I.S.R.A. experimental sinter box from both lean and rich ores were found by X-ray powder diffraction photography. Tables. (B16, M22, Fe)

130-B. The Permeability of Sinter Beds. E. W. Voice, S. H. Brooks and P. K. Gledhill. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 136-139.

Permeability, measurements and typical values. Diagrams. (B16, Fe)

131-B. Flowsheets of the Crushing Plant and Martite Recovery Plant. *Mining World,* v. 15, June 1953, p. 40-42.

Describes operation. Photographs. (B13, Fe)

132-B. World's Richest Antimony Mine. *Mining World,* v. 15, June 1953, p. 47-52.

Extraction and recovery operations at Consolidated Murcheson in South Africa. Photographs, flowsheets. (B12, Sb)

133-B. Zirconium Ores. Oliver C. Ralston. Paper from Zirconium and Zirconium Alloys. p. 1-4. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Methods of concentration and separation from other dense minerals are listed and discussed. (B14, Zr)

134-B. (German.) **Technical and Economic Questions on the Use and Production of Foundry Coke.** H. Wübbenhorst. *Giesserei,* v. 40, no. 10, May 14, 1953, p. 258-262.

Most suitable type of coke for foundry practice. Type of coal to be used and coking conditions to be observed in the production of a high-grade foundry coke. Graphs, tables, photographs. 10 ref. (B18, E10)

135-B. (Hungarian.) **Theory of the Hydrocyclone and Its Practical Application.** Gustav Tarjan. *Magyar Kémikusok Lapja,* v. 7, no. 9, Sept. 1952, p. 267-276.

Application of the hydrocyclone for enriching Mn slime, coal washing, and purifying pyrite for cer-

amic production. Tables, charts, photographs. 11 ref. (B13, Mn)

136-B. De-Leading a Copper Concentrate. Peter S. Jack. *Canadian Mining and Metallurgical Bulletin,* v. 46, June 1953, p. 373-375.

Method of recovering Pb by blanketing the Cu concentrate. Testing procedures and results. Photographs, tables. (B14, Cu, Pb)

137-B. The Application of the Liquid-Solid Cyclone as a Classifier in Closed-Circuit Grinding at Rand Leases (V) G.M. Co. Ltd. M. J. Dennehy and S. K. De Kok. *Chemical Metallurgical & Mining Society of South Africa, Journal,* v. 53, March 1953, p. 261-278; disc., p. 278-284.

Design of the cyclone, operating characteristics, and method of fitting it into the plant. Results obtained to date. Diagrams, tables. (B13)

138-B. Castable Refractories in the Steel Mill. J. D. McCullough. *Iron and Steel Engineer,* v. 30, June 1953, p. 84-89; disc., p. 89-93.

Castables having alumina-silica base and densities of 125 lb. per cu. ft. dried weight. Properties, installation, and typical applications. Diagrams, photographs. (B19)

139-B. Chemical Treatment of Low-Grade Manganese Ores. Conversion of Manganese Dioxide Into Manganese Sulphate. Ruth Blumberg and T. D. Morgan. *Journal of Applied Chemistry,* v. 3, May 1953, p. 223-233.

New method for converting MnO_2 into $MnSO_4$ by treating Mn wad with gaseous SO_2. Graphs, diagrams, tables. (B14, Mn)

140-B. Beneficiation of Low Grade Chrome Ore From Dodkatur, Mysore State. M. C. Sen and P. I. A. Narayanan. *Journal of Scientific & Industrial Research,* v. 12A, Apr. 1953, p. 185-187.

Experimental procedures and results. Tables. (B14, Cr)

141-B. Sherritt Gordon Uses Ammonia Leach for Lynn Lake Ni-Cu-Co Sulphides. *Mining Engineering,* v. 5, June 1953, p. 576-581.

Development of a hydrometallurgical process for recovering pure metal from sulfide concentrate. Photographs. (B14, Ni, Cu, Co)

142-B. Grinding Ball Classification. Its Effect on Capacity and Ball Migration. C. MacArthur Carman. *Rock Products,* v. 56, June 1953, p. 106-109, 151.

Effect upon grinding mill capacity and grinding ball migration resulting from improved grinding ball classification. Diagrams. (B13)

143-B. Crushing Practice and Theory. XVI. Brownell McGrew. *Rock Products,* v. 56, June 1953, p. 128, 130, 132, 134, 136, 138, 140, 142, 144, 146.

Crusher operations in open and closed circuits are compared. Advantages of surge bins and storage piles. Tables. (B13)

144-B. Semi-Microchemical Method for Determining the Basicity of Slag. B. A. Generozov. Henry Brutcher Translation 2985, 6 pages. (From *Zavodskaya Laboratoriya,* v. 16, 1950, no. 6, p. 666-668.)

New method based on the extraction of a sufficient percentage of CaO to insure measurable consumption of acid solution during titration. Table, graph. 6 ref. (B21)

145-B. (German.) **Functions of Grinding.** G. F. Hüttig. *Monatshefte für Chemie,* v. 84, no. 2, 1953, p. 272-277.

Results of granulometric analysis as six functions of grinding. Application of statistical mechanics to grinding processes. Graphs. 6 ref. (B13)

146-B. Andrew Carnegie, Geochemistry and Refractories. E. F. Osborn. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 103-114.

Research into development of better refractories. Photographs. (B19)

147-B. Some Raw Material Problems of the Indian Iron and Steel Industry. Phiroz Kutar. *Blast Furnace and Steel Plant,* v. 41, July 1953, p. 755-760.

Preparation of coal, ore, flux, oxygen, and ferro-alloys. (B10, B22)

148-B. Iron Ore. *Engineering and Mining Journal,* v. 154, July 1953, p. 100-109, 168.

Projects undertaken to meet the new era's demand for steel. Table, photographs. (B general, Fe, ST)

149-B. Thermal Beneficiation of Low Grade Manganese Ores. P. K. Gupte, G. P. Contractor, and B. R. Nijhawan. *Journal of Scientific & Industrial Research,* v. 12A, May 1953, p. 230-233.

Investigation to separate Fe from low-grade Mn ore by thermal reduction. A slag rich in Mn is obtained, which can subsequently be charged into the blast furnace for production of ferromanganese. Tables. (B14, Mn, Fe)

150-B. Crushing Plant Dust Control at the Ray Mines Division, Kennecott Copper Corp. John F. Knudsen. *Mining Engineering* v. 5, July 1953, p. 689-695.

Methods used in different processes to control dust dissemination. Tables, photographs. 6 ref. (B13, Cu)

151-B. (French) **Tests for Magnetic Roasting of Hematite at Striberg.** G. von Hofsten. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 10, no. 5, 1953, p. 693-729.

Series of tests for the above in a shaft furnace. The experimental arrangement is diagrammed and discussed. The results during eight periods are given and compared with those obtained in other installations. Tables, micrographs. 11 ref. (B15, Fe)

152-B. (Book.) **Aluminum in Iron and Steel.** Samuel L. Case and Kent R. Van Horn. 478 p. John Wiley & Sons, 440 4th Ave., New York 16, N. Y. $8.50.

An exhaustive, critical world-wide review of research on use of Al in modern ferrous metallurgy. Covers use of Al as a deoxidizer and as an alloy. (B22, Al)

153-B. Refractories. Their Classification. Ray A. Witschey. *Canadian Metals,* July 1953, p. 28.

Classification based on chemical and mineralogical separations and physical form. (B19)

154-B. The Electrical Conductivity of Wüstite Melts. Henry Inouye, J. W. Tomlinson, and John Chipman. *Faraday Society, Transactions,* v. 49, July 1953, p. 796-801.

As an approach to slag reactions the electric conductances of liquid wüstite, the wüstite + silica system, and SiO_2 were examined. Diagrams, table, graphs. 5 ref. (B21, P15, ST)

155-B. The Pumping, Transmission and Burning of Tar and Pitch. Warren A. Pond. *Iron and Steel Engineer,* v. 30, July 1953, p. 94-97; disc., p. 98-99.

Selection of equipment for handling and burning tar and pitch from coke ovens in steel mill furnaces. (B18)

156-B. Metals, Mining and Meditation. Bruce W. Gonser. *Mines Magazine,* v. 43, May 1953, p. 33, 45, 50.

Unusual sources of metals including the ocean and plants. (B10)

157-B. Recent Improvements in Flotation of Oxide Manganese Ores. Joe B. Rosenbaum and Carl H. Schack. *Mines Magazine,* v. 43, Mar. 1953, p. 67-69.

Ores tested and treated, laboratory developments, pilot plant operations, process limitations, and possibilities. (B14, Mn)

158-B. The Recovery of Copper From Low-Grade Material. Lyle M. Barker. *Mines Magazine,* v. 43, Mar. 1953, p. 99-102.

Shows that mass production makes recovery profitable. Beneficiation process and equipment. Photographs. (B14, Cu)

159-B. A Contribution to the Study of Modern Ore Dressing. Clarence Thom. *Mines Magazine,* v. 43, May 1953, p. 27-31.

Regional problems. Procedure for preliminary laboratory examination of ores. Photographs. (B13, B14)

160-B. (German.) **Phosphor-Alloyed, Sintered Steel.** Fritz Eisenkolb. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 257-266.

Possibilities of alloying P to Fe. Photographs, tables, graphs. 13 ref. (B16, ST)

161-B. (Portuguese.) **Estimate of the Iron Ore Reserves of Brazil. Geographic Distribution of Deposits.** Luciano Jacques de Moraes. *Boletim da Associacao Brasileira de Metais,* v. 8, no. 29, Oct. 1952, p. 389-407.

Maps. 96 ref. (B10, Fe)

162-B. (Portuguese.) **Columbium and Tantalum: the Jet-Propulsion Metals.** Geir Campos. *Engenharia, Mineracao E Metalurgia,* v. 18, no. 105, Mar.-Apr. 1953, p. 123-125.

World deposits, particularly those in northeastern Brazil. Photographs, table. 13 ref. (B10, Cb, Ta)

163-B. (Russian.) **Jigging of Rudabania Iron Ores in Heavy Suspension.** G. Tarian and G. Palfi. *Acta Technica Academiae Scientiarum Hungaricae,* v. 3, no. 3-4, 1952, p. 365-379.

Separation by specific weight found preferable to jigging in pure water. Photographs, graphs. 2 ref. (B14, Fe)

164-B. Recovering Minute Gold Contents From Chloridized Residues. C. C. Downie. *Mining Journal,* v. 241, July 31, 1953, p. 138-139.

Different roasting systems, features in recovery of the small Au content, and reactions of Au precipitation. (B15, Au)

165-B. Supplementary Tests on Ore From the Mother Lode Mine, Ravenswood. J. T. Woodcock and H. H. Dunkin. Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne, Australia, Investigation 425, 1952, 3 p.

Data on recovery of Au from the concentrates. Tables. (B14, Au)

166-B. Gold and Sulphur Recovery Tests on a Sample of Ore From Hill 50 Gold Mine (N. L.), Mount Magnet, W. A. Evan E. Hughes, C. H. Meharry, and R. A. Hobson. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 507, Dec. 11, 1951, 18 p.

Tests on the recovery of S as a sulfide concentrate suitable for H_2SO_4 manufacture, without seriously affecting the recovery of Au. Tables. (B14, Au)

167-B. (Hungarian.) **Present Problems of Hungarian Production of Ferro-Alloys.** Gyorgy Dobos. *Aluminium,* v. 4, no. 11, Nov. 1952, p. 241-251.

Theoretical and practical points with special regard to the technological problems of those branches which are new in Hungary. Production of ferrotungsten, ferromolybdenum, ferrovanadium, and ferrotitanium. Tables, graphs, diagrams. (B22, Fe, W, Mo, V, Ti)

168-B. (Russian.) **Decreasing the Sulphur Content in Coal Flotation Concentrates.** D. S. Emel'ianov. *Ugol',* no. 4, 1953, p. 36-39.

Function of flotation oil foam, time and size of particles. Tables, diagrams. (B14, S)

169-B. Laboratory Procedures for Determining Pelletizing Characteristics of Iron Ore Concentrates. T. E. Ban and L. J. Erck. *Mining Engineering,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 196, 1953, p. 803-811.

Strength-temperature relationships in pelletizing; effect of chemical additives on agglomeration; and crushing, abrasion, and impact resistance of the pelletized products. Concentrates of five different Fe ores were used. Graphs, photographs, tables. 12 ref. (B16, Fe)

170-B. An Investigation of the Collecting Effects of Fatty Acids in Tall Oil on Oxide Minerals, Particularly on Ilmenite. R. T. Hukki and O. Vartiainen. *Mining Engineering,* v. 5, Aug. 1953, *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 196, 1953, p. 818-820.

Collecting power was found to increase with increasing unsaturation. Linoleic acid was found to be an excellent collector. Graphs, photographs. 10 ref. (B14)

171-B. The Charles M. Schwab Memorial Lecture. Research and the Minor Constituents of Steel. John Chipman. *American Iron and Steel Institute,* May 1953, 21 p.

Importance of the minor constituents in steel. Graphs. (B22, ST)

172-B. Review of European Operating and Technical Practices. William C. Bell. *American Iron and Steel Institute,* New York, May 1953, 54 p.

Need in Europe for rapid and economical refining processes. Production of coke, coal, Fe and steel. Tables, graphs, photographs, diagrams. (B18, D general, CI, CN)

173-B. Refractories in the Service of Industry. D. Dixon. *Refractories Journal,* June 1953, p. 246-248, 255; July 1953, p. 297-300.

Technical progress, changing needs and output of ceramic refractories. Use of fireclay refractories in the iron and steel industry. Photographs. (B19, D general)

174-B. (Swedish.) **Fluxes For Melting Aluminum Alloys.** T. Malmberg and G. Coyet. *Gjuteriet,* v. 43, no. 6, June 1953, p. 109-114.

Different methods for comparing the efficiency of different fluxes. Photographs, tables, diagrams. (B21, Al)

175-B. (Book.) **Non-Ferrous Ore Dressing in the U. S. A. O. E. E. C. Documentation.** *Report of the Technical Assistance Mission,* no. 54. 210 p. H. M. Stationery Office, London. 10s.

Summarizes latest designs and developments in processes of ore-dressing and reports of unit processes. Diagrams.
(B general, Pb, Zn, Cu, Au, Ti)

176-B. (Book—French.) **(Mechanical Preparation and Concentration of Minerals by Flotation and Heavy Media Separation.) Préparation Mecanique et Concentration des Minerais par Flotation et sur Liqueurs Denses.** Ed. 2. Horace Havre. 759 p. 1952. Librairie Polytechnique Ch. Béranger, Paris, 15, Rue des Saints-Peres.

Presents a theoretical and practical report on machinery and methods of ore concentration. (B14)

177-B. Flotative Properties of Titanium Minerals in Oleate Solutions. V. S. Pradhan and D. W. Mitchell. *California Journal of Mines and Geology,* v. 49, July 1953, p. 269-272.

Results of captive bubble and batch flotation tests. Tables, graphs. 12 ref. (B14, Ti)

178-B. Factors Affecting Ore Separations in a 4-In. DSM Cyclone Separator. Earl C. Herkenhoff. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 88-91.

Information on medium and ore flows when minus-¼-in. low-grade Fe ores are treated in cyclone separators. Diagrams, tables. (B14, Fe)

179-B. Magma Copper Uses Factorial Design for Better Testing. F. T. Davis and A. C. Dorenfeld. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 97-99.

Importance of significant testing procedures for flotation reagents. (B14, Cu)

180-B. Sintering and Pelletizing. *Iron and Steel,* v. 26, Aug. 1953, p. 395-396.

Application in ore preparation and blast furnace research. (B16, D1)

181-B. Iron and Steel on the Move. Clyde Williams. *Monthly Business Review,* v. 35, Aug. 1953, p. 12.

Changing pattern of iron ore supply. Table. (B10, Fe, ST)

182-B. Rare Metals. Their Production and Utilisation. *Australasian Engineer,* 1953, July, p. 41-45.

Includes "Beach Sand Mining in Southeastern Queensland", O. D. Paterson; "Factors Controlling the Occurrence of Heavy Mineral Beach Sand Along the Queensland and New South Wales Coasts", O. A. Jones; and "Concentration of Beach Sand Minerals", K. S. Blaskett. Table. (B general, Zr, Ti, EG-b)

183-B. A Review of the Effects of Titanium and Zirconium in Steel. L. C. Bogan. *Australasian Engineer,* 1953, July, p. 51-55.

Uses as scavenging agents and alloying elements. (B22, Zr, Ti, ST)

184-B. Research and the Minor Constituents of Steel. John Chipman. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1057-1064, 1106.

The Charles M. Schwab Memorial Lecture, presented before the General Meeting of AISI, New York, May 27-28, 1953. Research on effects of S, P, N_2, residuals, Mn, B, V, O_2, deoxidizers, C and H_2 in steel. Graphs. (B22, Q general, ST)

185-B. Rod Milling at Snow Lake. B. G. MacDeermid. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 497, Sept. 1953, p. 535-544; disc., p. 544-546; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 271-282.

Equipment and performance data for the first 3½ years of service with emphasis on control of rod slippage. Photographs, tables, diagrams. (B13)

186-B. The Hollinger Crushing Plant. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 497, Sept. 1953, p. 550-575; disc., p. 575-576; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 286-312.

Equipment and costs of crushing and handling Au ore since 1941. Tables, charts, photographs, diagrams. (B13, Au)

187-B. Modern Techniques in Non-Ferrous Ore Dressing. *Chemical & Process Engineering,* v. 34, Aug. 1953, p. 245-247.

Report of the mission to the U. S. of the Organization for European Economic Co-Operation extracted. (B13, B14, EG-a)

188-B. New Metals and Alloys Plant. *Chemical Engineering,* v. 60, Sept. 1953, p. 134, 136, 137.

New Electromet plant at Marietta, Ohio. The "Simplex" process is mentioned. Photographs. (B22, Fe-n)

189-B. The Fluidized-Bed Sulfate Roasting of Nonferrous Metals. Frank M. Stephens, Jr. *Chemical Engineering Progress,* v. 49, Sept. 1953, p. 455-458.

Equipment which permits isolation of Cu and Co sulfates while Fe is in an insoluble oxide form. Photograph, graph, tables. (B15, Co, Cu)

190-B. Ferrocoke. Gwynne Cellan-Jones. *Coke and Gas,* v. 15, Sept. 1953, p. 315-320.

Production and uses. Results of experimental work on developing a coke-ore mixture satisfactory for blast-furnace burden. (B22, D1, Fe)

191-B. Ammonia; Ammonium Carbonate Leaching of Low Grade Zinc Ores. William J. Wendt. *Engineering and Mining Journal,* v. 154, Sept. 1953, p. 84-90.

Properties of NH_3, $(NH_4)_2CO_3$ solutions as solvent. Chemistry of the process, precipitation of Zn, effect of CO_2, construction materials and operating costs. Graphs, diagram. 6 ref. (B14, Zn)

192-B. Factors Affecting Ore Separations in a 4-In. DSM Cyclone Separator. II. Earl C. Herkenhoff. *Engineering and Mining Journal,* v. 154, Sept. 1953, p. 95-99, 206.

Procedure for standardizing ore separation tests. Diagram, tables. 6 ref. (Concluded.) (B14, S22)

193-B. A Corrected Interpretation of the Mechanism of Growth of Magnetite During Oxidation. M. H. Davies, M. T. Simnad, and C. E. Birchenall. *Journal of Metals,* v. 197, 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1250.

Corrects original interpretation. (B15, Fe)

194-B. B.I.S.R.A.'s North-East Coast Laboratories. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 67-69.

Research on pelletizing, sintering, permeability and carbon hearths. Use of radioactive tracer techniques in research on blast furnaces. (B16, D1, S19, Fe)

195-B. From Ore Testing to Cost Estimation. *Mining Engineering,* v. 5, Sept. 1953, p. 868-875.

Includes "Ore Testing to Determine Flowsheet Prior to Plant Design", Bruce Irwin, V. L. Mattson, Gene Meyer and S. Power Warren; "Fundamentals of Mill Design", H.

L. McNeill; "The Value of Ore Bedding Systems", Warren L. Hawes; and "Methods of Estimating Plant Construction Cost", H. V. Hughes. Photographs. (B general, A4)

196-B. Mining and Milling of Lithium Pegmatites at Kings Mountain, N. C. E. R. Goter, W. R. Hudspeth, and D. L. Rainey. *Mining Engineering*, v. 5, Sept. 1953, *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 196, 1953, p. 890-893.

Plant layout, equipment, past and present mining techniques and flotation procedure. Photographs, diagram. (B12, B13, B14)

197-B. Minas de Iguala's 1,000-Ton-Per-Day Mill at Parral Treats Esmeralda Lead-Zinc Ore. II. Robert L. Burns. *Mining World*, v. 15, Sept. 1953, p. 52-55.

Operations including Pb and Zn flotation. Photographs, tables, diagrams. (B14, Pb, Zn)

198-B. Agstone. By-Product of Zinc and Lead Processing. L. David Minsk. *Rock Products*, v. 56, Aug. 1953, p. 188, 190.

Recovery of a dolomitic agricultural limestone from tailings in processing ore. Photographs. (B general, A8, Zn, Pb)

199-B. The Metallurgical and Refractory Applications of Chromite and Chromium. R. A. Dodd. *South African Mining and Engineering Journal*, v. 64, pt. 1, Aug. 22, 1953, p. 1025, 1027.

Occurrence, properties and uses of the ore. Applications of metallic Cr in ferro-alloys, steels and heat resisting alloys. (B19, B22, T general, Cr)

200-B. Concentration of Klukwan, Alaska, Magnetite Ore. R. R. Wells and R. L. Thorne. U. S. Bureau of Mines, Report of Investigations no. 4984, June 1953, 15 p.

Ore samples and laboratory methods of concentration. Tables. (B14, B11, Fe)

201-B. Concentration Tests of Manganese Ores. A. L. Engel. U. S. Bureau of Mines, Report of Investigations no. 4985, June 1953, 14 p.

Ores from various locations. Considers gravity concentration and flotation. Tables. (B14, Mn)

202-B. The Future of Birmingham Red Iron Ore, Jefferson County, Ala. I. History and Ore Reserves. J. R. Thoenen and Avery H. Reed, Jr. **II. Concentration.** B. H. Clemmons. U. S. Bureau of Mines, Report of Investigations no. 4988, July 1953, 71 p.

History and ore reserves. Magnetic separation, differential grinding, gravity concentration, and flotation. Tables, photographs. (B10, B13, B14, Fe)

203-B. (English.) **Argentine Asphaltites as Blending Material for Poorly Coking Coals.** Alfred R. Powell. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.17, 1952, 6 p. Published jointly by ECLA-TAA for United Nations.

Study of three asphaltites for use in blending with poorly coking coals. Tables. 3 ref. (B18)

204-B. (English.) **Coal Washery Performance as Related to Blast Furnace Costs.** John D. Price. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.26, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Preferred method by which the optimum efficiency point of impurity removal of coal may be determined. 9 ref. (B18, D1)

205-B. (English.) **Description of Chilean Coals Used in the Steel Industry.** Alfredo Gonzalez. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.6, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Chilean coal production and characteristics and use in steelmaking. Tables. (B18, D general)

206-B. (English.) **Improving Coking Qualities of Coal by Addition of Various Materials.** Alfred R. Powell. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.15, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.

Studies to improve coke quality by blending various materials with weakly coking coals. Tables. 8 ref. (B18)

207-B. (English.) **Metallurgical Coke From Chilean Coals.** Américo Albala. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.21, 1952, 26 p. Published jointly by ECLA-TAA for United Nations.

Resume of investigations on the coking properties of Chilean coals for use in steel mill operations. Tables. (B18)

208-B. (English.) **Notes on the Production of Metallurgical Coal in Brazil.** Alvaro De Paiva Abreu. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.5, 1952, 14 p. Published jointly by the ECLA-TAA for United Nations.

Quality of coal produced in Brazil and problems in processing. Tables. (B18)

209-B. (English.) **Production of Metallurgical Coke in Mexico.** Salvador Cortés Obregon. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-

CONF. no. 1/L.20, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Production of coke and results of tests to determine quality. Tables. (B18)

210-B. (French.) **Preparation of the Charge for Blast Furnaces Using Lorraine Minettes.** Paul Thierry. *Metallurgie et la construction mecanique,* v. 85, no. 7, July 1953, p. 543-545.

Crushing of the ore and agglomeration of the fines. (To be continued.) (B13, Fe)

211-B. (German.) **Production, Properties, and Use of Brown Coal High-Temperature Coke.** Heinz Wubbenhorst. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1117-1118.

A low-temperature distilling technique for producing metallurgical fuel. Diagrams, photograph, table. 4 ref. (B18)

212-B. (German.) **Status and Development of Blende Roasting at Nievenheim Zinc Works of Stolberger Zinc Co.** Gottfried Haufe and Heinz Jahn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 7, July 1953, p. 249-257.

Processing and physical plant of Nievenheim Works. Scrap testing and apparatus used. Tables. 6 ref. (B15, A8, Zn)

213-B. (Russian.) **Peculiarities of the Reducing Magnetization Process of Oxide Iron Ores.** V. A. Roiter, V. I. Karmazin, V. A. Iuza and A. N. Kuznetsov. *Zhurnal Fizicheskoi Khimii,* v. 27, no. 1, Jan. 1953, p. 125-129.

Conditions promoting step reduction of oxides. Graphs, table. (B14, Fe)

214-B. (Spanish.) **Iron Ore, Coal, and Limestone Deposits Studied With Respect to Their Use in the Iron and Steel Industry of Colombia.** Benjamin Alvarado. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.28, 1952, 30 p. Published jointly by ECLA-TAA for United Nations.

General description of the most important Colombian deposits and extent of exploitation. Tables. (B10, Fe)

215-B. (Spanish.) **Mixtures for the Production of Metallurgical Coke in the Western United States.** John D. Price. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.12, 1952, 35 p. Published jointly by ECLA-TAA for United Nations.

Possibility of correlating work accomplished elsewhere with the improvement of the coke made from Latin American coal. Compares coals from the Western U. S. with those in Latin America. Charts. (B18)

216-B. Constitution of the FeO-Fe_2O_3-SiO_2 System at Slagmaking Temperatures. R. Schuhmann, Jr., R. G. Powell, and E. J. Michal. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institution of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1097-1104.

Liquidus surfaces in FeO-Fe_2O_3-SiO_2 system were determined from 1250 to 1450° C. by equilibrating small samples in Pt crucibles, quenching and microscopic examination. Experimental results were combined with previously published information to construct a ternary diagram for the system showing the entire temperature-composition range of stability of iron silicate slags. Metallurgical applications of the diagram, especially in Cu smelting. Micrographs, diagrams. (B21, Cu, Fe)

217-B. (Book.) **Lake Superior Iron Ores.** Ed. 2. 334 p. 1952. Lake Superior Iron Ore Assoc., Hanna Building, Cleveland, Ohio.

Statistical record of the individual mining properties in the Lake Superior District, supplemented by maps and tables relating to the Lake Superior iron ore industry and to iron ore generally (B10, B12, Fe)

218-B. (Book—German.) **Sulfur. System no. 9, Gmelin's Handbook of Inorganic Chemistry.** Sec. A2, 8th ed. 450 p. 1952. Verlag Chemie, G.m. b.H., Weinheim/Bergstrasse, West Germany. (Available from Walter J. Johnson, 125 E. 23rd St., New York.) $35.30.

A complete review and critical analysis of the occurrence and technology of S and S compounds, colloidal chemistry, and physiological phenomena. (B22)

219-B. (Book—German.) **Sulfur. System no. 9, Gmelin's Handbook of Inorganic Chemistry.** Sec. B1, 8th ed. 372 p. 1953. Verlag Chemie, G.m. b.H., Weinheim/Bergstrasse, West Germany. (Available from Walter J. Johnson, 125 E. 23rd St., New York.) $29.40.

Discusses derivation of H_2S, its physical properties, and its chemical behavior. Includes combustion of H_2S and its reactions with metals. (B22)

220-B. (Book—German.) **(The Metallurgy of Ferro-Alloys.) Die Metallurgie der Ferrolegierungen.** R. Durrer and G. Volkert. 409 p. 1953. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 72 DM.

General and special metallurgy of the ferro-alloys. Furnace construction and electrical installation. (B22, D5)

221-B. Nodulizing Iron Ores & Concentrates at Extaca Plant. R. L. Mennett, R. E. Hagan, and M. V. Mielke. *Skillings Mining Review,* v. 42, Oct. 17, 1953, p. 1-2, 4, 21, 23.

Nodulizing process, and experimental kiln installation. Photographs. (B16, Fe)

222-B. Report on Taconite. *Steelways,* v. 9, Oct. 1953, p. 1-5.

Progress in developing commercial concentration methods. Photographs, diagrams. (B14, Fe)

223-B. Porosity and Adsorptivity in Iron Ores From New Quebec Compared With Standard Ores. Jean Laneuville. *Laboratories Branch, Dept. of Mines,* Province of Quebec, Canada, P. R. No. 277, 1953, 18 p.

Research carried out on eight samples. Volumes of Hg, H_2O, H_2, air and CO_2 penetrating the pores of each ore measured. Tables, diagram, graphs. (B10, Fe)

224-B. (French.) Some Recent Progress in Ore Concentration and the Production of Nonferrous Metals. Maurice Rey. *Revue universelle des mines,* v. 9, ser. 9, no. 7, July 1953, p. 417-424.

Mechanical, chemical and thermal procedures. (B14, C general, EG-a)

225-B. Heavy-Media Separation Processes for Mineral Concentration. *American Cyanamid Company, Mineral Dressing Notes,* no. 19, May 1953, 32 p.

Representative plants for iron, lead, zinc, lead-zinc, fluorspar, tin, diamondiferous, chrome and manganese ores; and for magnesite, dolomite, andalusite, gravel, brucite and coal. Photographs, diagrams. 82 ref. (B14)

226-B. Refractory Policy and Control. G. Reginald Bashforth. *British Steelmaker,* v. 19, Oct. 1953, p. 586-594.

Progress made in silica, basic and fireclay refractories for steelmaking. Desirable qualifications of a steelworks refractory officer and functions which he should fulfill. Tables, photograph. 10 ref. (B19, D general)

227-B. FluoSolids Roasting of Zinc Concentrates for Contact Acid. T. T. Anderson and R. Bolduc. *Chemical Engineering Progress,* v. 49, Oct. 1953, p. 527-532.

Design problems and development of the first commercial plant in North America for roasting process. Diagrams, graph, table. (B15, Zn)

228-B. Carbon in the Engineering and Metallurgical Industries. II. Industrial Carbons. V. S. Kingswood. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 133-138.

Production of industrial carbons and typical applications. Tables, photographs, graph, diagram. 6 ref. (B22, C)

229-B. Power and Stability of Flotation Frothers. Governing Factors. S. A. Wrobel. *Mine & Quarry Engineering,* v. 19, Oct. 1953, p. 363-367.

Factors relating to froth stability and power. Hypotheses for phenomena of froth formation. Diagrams. (B14)

230-B. The Sydvaranger Story. *Mining World,* v. 15, Oct. 1953, p. 49-72, 74-76.

Group of articles covering history of taconite operations in Norway, geology of the area, ore removal and processing, mill equipment and power generation. (B general, Fe)

231-B. (English.) Contributions to the Classical Theory of Jigging. G. Tarjan. *Acta Technica Academia Scientiarum Hungaricae,* v. 6, nos. 1-2, 1953, p. 79-121.

Motion of a solid body in a pulsating up-and-down current. Tables, graphs, diagrams. (B14)

232-B. Studies in the Carbonate Leaching of Uranium Ores. I. Description of the Pressure Leach Process and Its Application to Pitchblende Ores. F. A. Forward and J. Halpern. **II. Kinetics of the Dissolution of Pitchblends.** E. Peters and J. Halpern. **III. Precipitation of Uranium from Carbonate Solutions by Reduction With Hydrogen.** F. A. Forward and J. Halpern. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 498, Oct. 1953, p. 634-648; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 344-358.

Tables, graphs. 19 ref. (B14, U)

233-B. Metallurgical Investigations of Southeastern Missouri Cobalt-Nickel Resources. H. Kenworthy and K. K. Kershner. *U. S. Bureau of Mines, Report of Investigations* 4999, Sept. 1953, 37 p.

Sulfide-ore concentrates were treated successfully on a laboratory scale to recover more than 90% of the cobalt, nickel and copper. Commercial treatment netted a recovery of over 75% of the cobalt and about 90% of the nickel and copper in the form of a lead-zinc fume, a copper sulfide concentrate, and a cobalt-nickel-iron product. Tables, micrographs, diagrams. 44 ref. (B10, B14, Co, Ni, Pb, Zn, Fe, Cu)

SECTION C

NONFERROUS EXTRACTION and REFINING

1-C. Monovalent Aluminum. J. P. McGeer. *Journal of Chemical Education,* v. 29, Nov. 1952, p. 534-538.

Properties of compounds and their possible use in Al production. Graphs 37 ref. (C general, Al)

2-C. Chlorine Metallurgy. W. J. Kroll. *Metal Industry,* v. 81, Sept. 26, 1952, p. 243-245; Oct. 3, 1952, p. 269-271; Oct. 10, 1952, p. 284-286; Oct. 17, 1952, p. 307-311; Oct. 24, 1952, p. 325; Oct. 31, 1952, p. 341-343; Nov. 7, 1952, p. 365-366.

Applications of Cl in metal reduction and beneficiation. Basic reactions, valency changes, purification and separation methods, chlorination of low grade chromites and Ni ores, chlorination on an industrial scale, tabulation of metal-chloride displacement reactions, hydrogen reduction of gases, solid cathode deposits, and soluble alloy anodes. 216 ref. (C4, B14)

3-C. Some Exporatory Experiments on the Formation and Contro of Magnetite During Copper Smelting Operations. E. C. Ellwood and T. A. Henderson. *Bulletin of the Institution of Mining and Metallurgy,* Nov. 1952, *Transactions,* v. 62, part 2, 1952-53, p. 55-65.

Reactions of magnetite, nature of hearth accretions, behavior of magnetite in slag, formation of magnetite during smelting operations, reduction of magnetite in converter slag, and treatment of magnetite-rich furnace hearth deposits. 12 ref. (C21, Cu)

4-C. Electrolytic Processes in Chemical and Metallurgical Industry. Principles of Electrolytic Processes. H. J. T. Ellingham. *Chemistry & Industry,* Nov. 15, 1952, p. 1115-1118.

General discussion includes electrolytic extraction, refining, and electroplating. (C23, L17, EG-a)

5-C. Electrical Conductivity of Molten Cryolite and Potassium, Sodium, and Lithium Chlorides. Junius D. Edwards, Cyril S. Taylor, Allen S. Russell, and L. Frank Maranville. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 527-535.

Improved technique developed for determination of electrical conductivity of reactive molten salts in cryolite baths used in the Hall process for production of Al. 26 ref. Graphs and tables. (C23, Al)

6-C. Approach to Melting Reactive Metals Eliminates Use of Refractory Containers. T. T. Magel, P. A. Kulin, and A. R. Kaufmann. *Journal of Metals,* v. 4, Dec. 1952, p. 1286-1288.

Two methods of induction melting without refractory crucibles developed and used at the MIT Metallurgical Project. Diagrams and photographs. (C21, Zr, Ti)

7-C. Lead Blast Furnace Gas Handling and Dust Collection. R. Bainbridge. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952. p. 1302-1306.

Selection and design of equipment and operating details in the modernized Pb blast furnace plant of the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, B. C. Diagrams and tables. (C21, A7, Pb)

8-C. (German.) **Combustion and Reduction of Fine-Grained Substances in a Downward Airflow With Particular Application to Zinc Oxide-Coal Mixtures.** Ernst-Justus Kohlmeyer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Oct. 1952, p. 385-389.

Earlier experiments and application of the process on the plant level. New experiments for establishing the peculiarities of the process, and possibilities for large-scale application. Tables, charts, diagrams. (C21, Zn)

9-C. A Line Frequency, Coreless Induction Furnace for Melting Aluminum. K. H. Brokmeier. *Aluminium,* v. 28, Nov. 1952, p. 391-400.

Efficiency, bath movement, and working of the heat are compared with operation of core-type furnaces. Photographs and diagrams. (C21, Al)

10-C. Continuous Casting of Non-Ferrous Metals. Part III. Factors Controlling Permissible Speed of Casting. B. H. C. Waters. *Metal Treatment and Drop Forging,* v. 19, Nov. 1952, p. 474-478, 482.

Investigation of fractures and of mechanism responsible for fractures when certain maximum speeds are exceeded. Surface quality of mold and influence of lubricants. (To be continued.) (C5)

11-C. (Book.) **Electrochemical Data.** B. E. Conway. 374 pages. 1952. Elsevier Publishing Co., 445 Park Ave., New York 22, N. Y.

Besides information on pure electrochemistry, electrode potentials, solvation and ionic interaction in aqueous and non-aqueous solutions, data are included on some more quantitative aspects of applied electrochemistry. Provides modern data on electrochemistry of slags and fused melts and also on applications, both practical and theoretical, in the field of biophysics. (C23, L17)

12-C. Chemico Metal Techniques. William N. Porter. *Mining Congress Journal,* v. 38, Nov. 1952, p. 44-47.

Equipment and processes developed by Chemical Construction Corp. for the extraction and refining of Co, Ni, Cu, and Mn as powders which may make lower grade ores usable.
(C general, H10, Co, Ni, Cu, Mn)

13-C. Reducibility of Zinciferous Ores. E. Frenay. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 183-187.

Experiments were made on effects of SiO_2, zinc silicate, Fe_2O_3 on the rate of Zn extraction. (C21, Zn)

14-C. Phosphorus Deoxidation of Molten Copper. W. A. Baker. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 268-293.

Experiments on nature and limits of deoxidation products, equilibrium distribution of O_2 and P, time to attain equilibrium, and disturbance of equilibrium under a charcoal cover. Data are tabulated and charted. (C21, Cu)

15-C. Recent Advances in the Electrolytic Extraction of Manganese, Chromium and Cobalt. J. W. Cuthbertson. *Chemistry & Industry,* Nov. 29, 1952, p. 1165-1170.

Deals with each individually. (C23, Mn, Cr, Co)

16-C. Production Advancements in Titanium. Charles Ayres. *Light Metal Age,* v. 10, Dec. 1952, p. 12-13.

Brief general discussion. (C general, Ti)

17-C. The Production of Magnesium, Calcium, Tantalum, and Zirconium. G. L. Miller. *Vacuum,* v. 2, Jan. 1952, p. 19-32.

Use of vacuum in production of specific metals on an industrial scale. Flow sheets. 10 ref. (C25, Mg, Ca, Ta, Zr)

18-C. Electrometallurgy of Tin and Its Alloys. E. S. Hedges and J. W. Cuthbertson. *Chemistry & Industry,* Dec. 27, 1952, p. 1250-1254.

Reviews electrolytes from which Sn is usually deposited. Electrodeposition of Sn, Sn refining by electrolysis, electrolytic detinning, electro-tinplate, and electrodeposition of Sn alloys. 14 ref. (C23, L17, Sn)

19-C. On the Preparation of Magnesium Targets From MgO. Leonard N. Russell, Warren E. Taylor, and John N. Cooper. *Review of Scientific Instruments,* v. 23, Dec. 1952, p. 764.

Brief description in which Ta strip was used for the reduction. (C26, Mg, Ta)

20-C. (German.) **How Can Shadings Be Avoided in Continuous Casting of Shapes?** W. Spielvogel. *Metall,* v. 6, Nov. 6, 1952, p. 693-695.

Practical suggestions for solving above problem, caused by fluctuations of feed pressure in hydraulic press installations. Diagrams and photographs. (C5, D9)

21-C. (German.) **Regarding the Refining of Metals by Intermetallic Reaction.** Wilhelm Dautzenberg. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Nov. 1952, p. 432-439.

Emphasizes importance of intermetallic reactions. Possibilities of preferential crystalization, especially in regard to Al refining. (C general, Al)

22-C. (Portuguese.) **Elimination of Low Arsenic and Antimony Contents From Lead by the Modified Harris Process.** Tharcisio D. de Souza Santos. *ABM Boletim da Associacao Brasileira de Metais,* v. 8, July 1952, p. 280-298.

Apparatus, procedure, and results of investigation. Tables and graphs. 9 ref. (C21, Pb, As, Sb)

23-C. (Portuguese.) **Preliminary Study on the Kinetics of the Harris Process**

Modified for the Special Purpose of Eliminating Low Arsenic and Antimony Contents From Dezinced Lead. Tharcisio de Souza Santos. *ABM Boletim da Associacao Brasileira de Metais* v. 8, July 1952, p. 299-311.

Results of investigation.
(C21, Pb, As, Sb)

24-C. (Portuguese.) **Preliminary Note on Obtaining Alloys With an Elevated Zinc and Silver Content by Liquation of Parkes Crusts.** Tharcisio D. de Souza Santos. *ABM Boletim da Associacao Brasileira de Metais,* v. 8, July 1952, p. 312-327.

Proposes a process by which Parkes method is improved, yielding a crust of 62-69% Zn, and 17-23% Ag. Data are tabulated. Micrographs. (C21, Zn, Ag)

25-C. (Portuguese.) **Results From Distilling Zinc-Silver Alloys With a Low Lead Content in Cast Iron Retorts in a Vacuum.** Tharcisio D. de Souza Santos, Luiz C. Correa da Silva, and José Martini. *ABM Boletim da Associacao Brasileira de Metais,* v. 8, July 1952, p. 328-348.

Results show that distillation for 6-8 hr. at 850-900° C. leads to almost complete recovery of Zn from the charge. Tables, graphs, and diagrams. (C22, Zn, Pb)

26-C. The Extraction of Titanium. H. W. Worner and G. D. Cordner. *Australasian Institute of Mining and Metallurgy Proceedings,* New Series, No. 158-9, 1950, p. 65-87.

Various ways of making Ti.
(C general, Ti)

27-C. Practical Notes on Smelting Nickel Ores. C. C. Downie. *Mining Journal,* v. 239, Dec. 26, 1952, p. 738-739.

Efficiency of electric hearth and blast furnace practice in Ni ore smelting. Constructional details in connection with air blast. (C21, Ni)

28-C. Titanium Production at Rem-Cru. Walter L. Finlay, C. E. Newcomb, and M. Anthony. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 140-142.

Melting, rolling, tonnage-style processing, and production of ingots. Photographs. (C21, F23, Ti)

29-C. Titanium Production and Fabrication at Republic Steel Corp. T. E. Perry. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 150-151.

Arc and induction melting techniques. Forging, heat treating, welding.
(C5, F22, J general, K general, Ti)

30-C. Arc-Furnace Equipment and Its Operation at the Kennecott Utah Refinery. H. A. Shaw and H. G. G. Whitton. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 197-203.

Use of electric-arc furnace for production of tough-pitch, horizontal cast Cu shapes and production of Cu anodes from tank house anode scrap. Photographs. (C21, Cu)

31-C. An Examination of Joule's Work on the Metallurgy of Amalgams. H. J. Axon. *Metallurgia,* v. 47, Jan. 1953, p. 27-28.

Review of Joule's work on constitution of binary alloys of mercury, from the viewpoint of modern knowledge. Alloying of Hg with Fe, Cu, Ag, Zn, Pb and Sn.
(C29, Hg)

32-C. The Development of Rare Metals. J. W. Marden. *Journal of the Electrochemical Society,* v. 100, Feb. 1953, p. 37 C-39 C.

History of early experiments and reducing methods now in use.
(C general, EG-b)

33-C. Zirconium High-Temperature Experiments. Problems in the Production of Zirconium Alloys. *Chemical Age,* v. 68, Feb. 7, 1953, p. 247-250.

Three methods for direct production of Zr alloys without using metallic Zr. (C general, Zr)

34-C. Production of High Purity Lead. Italian Trials of Sulphamate Method. *Chemical Age,* v. 68, Feb. 7, 1953, p. 251-252.

Use of an electrolytic process.
(C23, Pb)

35-C. A Note on Some New Reactions for Refining Titanium. S. Ramamurthy. *Journal of Scientific & Industrial Research,* v. 11B, Dec. 1952, p. 545-546.

Suggests three new reactions for extraction of Ti. Graphs. 4 ref.
(C general, Ti)

36-C. (German.) **Removal of Bismuth by Blowing Copper Matte in the Converter.** Otto Nielsen. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, Jan. 1953, p. 9-12.

Attempt was made to remove Bi by fire refining of Cu. Principles, procedure, and results of process. Tables. (C21, Bi, Cu)

37-C. (German.) **Isothermic Desilvering of Raw Lead.** K. H. Lange-Eichholz and H. Wasow. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, Jan. 1953, p. 20-23.

New process does desilvering in a single step at room temperature. Test results and advantages. Photographs. 4 ref. (C28, Pb)

38-C. Recovery of Copper From Smelter Slags. Brahm Prakash and

C. V. Sundaram. *Journal of the Indian Institute of Science,* v. 35, sec. B, Jan. 1953, p. 17-27.

Investigates direct leaching of Cu with ammoniacal $(NH_4)_2CO_3$ and $Fe_2(SO_4)_3$ solutions; and extraction by sulfatizing roast. Tables. 16 ref. (C21, A8, Cu)

39-C. Magnesium Progress in Britain. C. J. P. Ball. *Light Metals,* v. 16, Feb. 1953, p. 56-60.

Production of Mg alloys at low cost and production of better alloys to meet requirements of aircraft industry. Graphs, photographs, and tables. (C general, Mg, Zr)

40-C. Separate Circuits for Antimony and Gold Ores in Consolidated Murchison Reduction Plant. *South African Mining and Engineering Journal,* v. 63, Part II, Jan. 24, 1953, p. 859-861, 863.

Flow plan of reduction plant; legend covering flow circuits; description of units installed; metallurgical treatment of ores; and water and power supplies. Photographs and diagrams. (C21, Sb, Au)

41-C. (German.) **Extraction of Cadmium in the Zinc Works at Magdeburg.** Walter Langner and August Göbel. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Dec. 1952, p. 480-485.

Electrolytic process of preparing Cd metal of 99.95% purity. (C23, Zn, Cd)

42-C. Gas-Burning Radial Engines Offer Low Cost, Efficient Power Generation. R. W. Bayerlein. *Gas Age,* v. 111, Mar. 12, 1953, p. 46-50, 92-94.

Operating information based on 120 engines which were in service for an average of 20,000 hr. each. Combination of efficiency and low upkeep makes engines ideally suited to electrolytic reduction of Al or other heavy duty power plant service. Photographs. (C23, Al)

43-C. The Hot-Wire Process for Zirconium. Robert B. Holden and Bernard Kopelman. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 120-125.

Study made of thermal decomposition of $ZrCl_4$ molecules which are isolated from effects of interaction with other tetra-iodide molecules and with reaction products. (C4, Zr)

44-C. A New Electrochemical Process for Indium. J. R. Mills, B. G. Hunt, and G. H. Turner. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 136-140.

Refining process and properties and uses of In. (C23, Q general, In)

45-C. Tristage Crystallization Process for Utilizing Western Ferrophosphorus. Lloyd H. Banning, Wallace E. Anable, and R. T. C. Rasmussen. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 423-430.

Results are presented of a completed laboratory project which developed a tristage crystallization and hydrolysis process for recovering V, Cr, and a valuable phosphorus product. Graphs and tables. (C28, V, Cr)

46-C. Indium. J. Lomas. *Mine & Quarry Engineering,* v. 19, Mar. 1953, p. 96-97.

Applications, recovery, and refining of In. (C general, T general, In)

47-C. (Book.) **The Casting of Non-Ferrous Ingots.** Leslie Aitchison and V. Kondic. 366 pages. Macdonald & Evans Ltd., 8, John Street, Bedford Row, London, W.C.1. 42s.

Theoretical background including elementary metallurgical approach to the preparation of liquid metal for casting; metallurgical aspects, comparing various metals and industrial alloys; and production aspects, dealing with actual preparation of ingots. (C5, EC-a)

48-C. The Control of Quality in the Production of Brass Ingots and Billets. Maurice Cook and C. L. M. Cowley. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 341-350.

Application of basic principles and practical knowledge to eliminate or minimize the incidence of defects. Tables. (C5, S12, Cu)

49-C. The Control of Quality in Melting and Casting Copper and High-Conductivity Copper-Base Alloys. J. Sykes. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 351-363.

Selection of raw materials and their blending into suitable furnace charges. Fire-refining process for the production of high-conductivity Cu wire-bars. Methods used in the production of phosphorus-deoxidized Cu, TeCu, CaCu, and AgCu. Diagrams and tables. 13 ref. (C21, Cu)

50-C. The Control of Quality in the Casting of Zinc and Zinc Alloy Rolling Slabs and Extrusion Billets. C. W. Roberts and B. Walters. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 365-375.

Various techniques and procedures adopted commercially. Importance of control of chemical composition both in raw materials and in the final products. Tables. (C5, S12, Zn)

51-C. Further Development of the Sterling Process. W. M. Peirce. *Min-*

ing Congress Journal, v. 39, Mar. 1953, p. 46-49, 78.

Method for smelting Zn ores using heat generated by an electric arc to carry on the reduction. Possibility of commercial application. Photographs. (C21, Zn)

52-C. (French.) Continuous Casting in the Foundry. J. Pascal. *La Métallurgie et la Construction Mécanique,* v. 85, Jan. 1953, p. 21, 23, 25.

General discussion. Includes charts. (C5, D9)

53-C. Arc Melts of Titanium-Rich Alloys. G. Welter, A. Choquet, and F. Claisse. *Canadian Mining Journal,* v. 74, Mar. 1953, p. 59-69.

Melting and testing apparatus and methods. Findings are given with respect to metallography and mechanical properties. Photographs, micrographs, graphs, tables, and diagrams. 23 ref.
(C21, M27, Q general, Ti)

54-C. A Brief Outline of the Mount Isa Copper Smelter. R. V. Anderson. *Mining Journal,* v. 240, Mar. 13, 1953, p. 300-301.

Details of several procedures used in smelting operations. Charge make-up, roasting, reverberatory furnace smelting, preheating primary air, refining, and casting. (C21, Cu)

55-C. Van Stone. American Smelting's Newest Zinc Operation. *Mining World,* v. 15, Apr. 1953, p. 26-31, 68-69.

Development and design features of the mill. Photographs. (C21, Zn).

56-C. Consumable-Electrode Arc Melting of Zirconium Metal. W. W. Stephens, H. L. Gilbert, and R. A. Beall. *Transactions of the American Society for Metals,* v. 45, 1953, p. 862-871.

Process, equipment, and furnace which offer practical means for producing large ingots of refractory metals and alloys. The power requirement is less than 0.5 kw-hr. per pound. Photographs and diagrams. 7 ref. (C21, Zr, EG-d)

57-C. (Italian.) Contribution to the Knowledge of Aluminium Electrolysis. A. Vajna. *La Metallurgia Italiana,* v. 44, Dec. 1952, p. 585, 587-597.

Presents experimental proof of the primary separation of Al at the cathode and O_2 at the anode in the electrolysis of cryolite and Al_2O_3 molten mixtures. The dispersed metallic phase at the cathode and the gaseous phase formed in the proximity of the anode are studied by new photographic method. (C23, Al)

58-C. The Caustic Electrolytic-Zinc Process. Charles T. Barock, R. V. Hilliard, and R. S. Lang. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 165-172.

Results of work on this process indicate that it is technologically feasible for many types of oxidized Zn ores, drosses, and calcines. Tables and graphs. 18 ref. (C23, Zn)

59-C. Vacuum Melting Lengthens Fatigue Life, Improves Impact Properties. James H. Moore. *Iron Age,* v. 171, Apr. 2, 1953, p. 154-156.

Advantages of using vacuum furnaces for melting nonferrous metals such as beryllium copper.
(C25, Q6, Q7, Cu)

60-C. Asarco Continuous-Cast Bearing Bronzes. J. S. Smart Jr., and Paul J. Kranz. *Mechanical Engineering,* v. 75, Apr. 1953, p. 287-290.

Continuous-casting of standard bronze compositions results in beneficial increases in mechanical properties. Tables, diagrams, and micrographs. (C5, Q general, Cu)

61-C. An Arc Furnace for Melting Refractory Metals. J. W. Pugh, R. L. Hadley, and R. W. Henning. *Metal Progress,* v. 63, Mar. 1953, p. 70-71.

Describes and diagrams the furnace, which used an inert atmosphere and a water-cooled metal crucible. (C21, SG-h)

62-C. Aspects of Continuous Casting of Non-Ferrous Metals. Part III. Factors Controlling Permissible Speed of Casting. Part IV. Porosity and Varying Influential Factors. Parts V and VI. Surface Appearance. B. H. C. Waters. *Metal Treatment and Drop Forging,* v. 19, Dec. 1952, p. 526-530, 532; v. 20, Jan. 1953, p. 3-10, 20-22; Feb. 1953, p. 79-83; Mar. 1953, p. 103-109.

Concluding installment of Part III reviews properties and influence of various lubricants used as mold dressings. Susceptibility of an alloy to hot tearing during continuous casting and factors controlling this. Part IV: Some physical properties of continuously cast ingots at varying speeds. Formation and cause of porosity, and influence of variation in casting and temperature rate. Part V correlates interriple distance and linear casting speeds. Part VI: Factors causing ripple formation on surface of continuously cast ingots. Reviews theories to explain ripple formation. 43 ref. (C5, E25, EG-a)

63-C. Zirconium. Metals' "Sleeping Beauty". *Midwest Engineer,* v. 5, Mar. 1953, p. 11-12, 20.

Difficulties encountered in production of Zr. (C general, Zr)

64-C. Recovery of Bismuth From Refinery By-Products. C. C. Downie.

Mining Journal, v. 240, Mar. 27, 1953, p. 362-363.

Various refining processes including oxidation, chlorination, and electro-refining. (C4, C23, Bi)

65-C. (Book—Russian.) **Calculations for the Metallurgy of Heavy Nonferrous Alloys.** F. M. Loskutov and A. A. Saidler. 384 pages. 1948. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Exemplary calculations are explained for various processes in metallurgy of Pb, Zn, Cu, Ni, and Sn. Many calculations are accompanied by detailed considerations of stepwise unit processes and heat balance.
(C general, Pb, Zn, Cu, Ni, Sn)

66-C. (Book—Russian.) **The Metallurgy of Zinc.** F. M. Loskutov. 355 pages. 1945. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Pyrometallurgy, hydrometallurgy, and electroplating of Zn. Previously abstracted from the German edition. See item 137-C, 1951.
(C 21, B general, L17, Zn)

67-C. Arc Furnace Developed for Casting Titanium. O. W. Simmons and Hugh R. McCurdy. *American Foundryman,* v. 23, Apr. 1953, p. 121-126.

Melting and casting process; essential features of the furnace; and use of inert atmosphere to prevent contamination. Photographs.
(C21, Ti)

68-C. Extraction of Zirconium and Hafnium with Various β-Diketones. Edwin M. Larsen and Glenn Terry. *American Chemical Society, Journal,* v. 75, Apr. 5, 1953, p. 1560-1562.

Distribution coefficients were determined for the partition of Zr and Hf between perchloric acid solution and a β-diketone containing benzene phase. Tables. 12 ref. (C28, Zr, Hf)

69-C. Titanium. S. W. Rowell and E. Swainson. *Discovery,* v. 14, Apr. 1953, p. 108-112.

Processes for producing high-purity Ti in quantities and mechanical properties. Photographs.
(C general, Q general, Ti)

70-C. Aluminum. Continuous Casting Gaining. R. L. Hatschek. *Iron Age,* v. 171, Apr. 23, 1953, p. 77-78.

Method paves way for small firms to integrate. Techniques improve steadily. Announces new Properzi model. (C5, Al)

71-C. On-Site Generator Plants Study Shows Aluminum Reduction at Over-All Power Cost of $168/Kw. *Light Metal Age,* v. 11, Apr. 1953, p. 16-17, 36.

Typical layout, geographical factors, and plan study. Equipment and cost of power. (C23, Al)

72-C. Metallurgical and Engineering Problems. V. Kondic. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 171-173.

Reviews some metallurgical and engineering problems in continuous casting in order to understand casting processes which are established industrially. (C5, D9)

73-C. Continuous Casting of Non-Ferrous Metals. F. Crowther. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 173-179; disc., p. 179.

Discusses continuous casting in terms of the "Junghans" and "Alcoa" techniques as they are used for Cu and Al-base alloys. Deals briefly with other methods and metals. (C5, Cu, Al, Mg, Zn)

74-C. Copper in Smelting-Furnace Slags. G. L. Evans. *Mining Magazine,* v. 88, Jan. 1953, p. 9-16; Feb. 1953, p. 85-93; Mar. 1953, p. 145-151; Apr. 1953, p. 206-218.

Thermodynamic considerations. Evidence of existence of particular forms of Cu in smelting furnace slags. Graphs and tables. 146 ref. (C21, Cu)

75-C. (Book.) **The Physical Chemistry of Copper Smelting.** R. W. Ruddle. 156 pages. Institution of Mining and Metallurgy, Salisbury House, London, E.C.2, England. £1.

Outline of the smelting process, constitution of matte and of Cu smelting slags, formation of magnetite, Cu losses, recovery of S from smelter gases, and elimination of impurities during copper smelting. (C21, Cu)

76-C. The Mechanism of Cyanidation. J. R. Lambert. *Canadian Mining Journal,* v. 74, Apr. 1953, p. 57-64.

Examines chemistry of Au cyanidation from the standpoints of polymerization and electron chemistry. Diagrams and tables. (C24, Au)

77-C. Asarco Rehabilitates Copper Refinery. Perth Amboy Plant Improves Operating Efficiency and Employee Morale. G. H. Weis, D. A. Busch, H. K. Spaulding, and G. B. Paulding. *Journal of Metals,* v. 5, May 1953, p. 616-623.

Complete rehabilitation of the refinery. Photographs. (C21, Cu)

78-C. Operations at New Cornelia Copper Smelter of Phelps Dodge Corporation. James W. Byrkit. *Journal of Metals,* v. 5, May 1953. *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 633-642.

Design features and operating methods at the new Ajo smelter. Shows that successful operation of a novel method of handling and charging wet concentrates to a deep bath-type reverberatory furnace contributes to daily production of 200 tons of anodes with good results from the standpoint of both metallurgy and economy. Tables, photographs and diagrams. (C21, Cu)

79-C. Note on Contamination of Silicon Ingots. G. Sandoz and H. E. Stauss. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 653.

Briefly discusses possibility that a melt may be contaminated by a material not in direct contact with it, by means of gaseous intermediate agents. (C21, Si)

80-C. Ion Exchange. Another Tool for Hydrometallurgy. *Mining Engineering,* v. 5, May 1953, p. 494.

Development, present applications, and possibilities. Process for recovery of gold from cyanide solutions by exchange. (C24, Au)

81-C. The Preparation of Samarium and Ytterbium Metals. A. H. Daane, D. H. Dennison, and F. H. Spedding. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2272-2273.

Describes procedure.
(C general, Sm, Yb)

82-C. An Early Method of Vacuum-Melting Tantalum. M. Pirani. *Vacuum,* v. 2, Apr. 1952, p. 159-160.

Historical comments on production and use of Ta metal. (C25, Ta)

83-C. (French.) **Methods for Preparing Pure Scandium.** Vasudeva Kilara Iya. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 6, Feb. 9, 1953, p. 608-610.

Powdered thortveitite was heated in an excess of C to form Sc carbides, which are in turn decomposed by HCl. The ScO obtained is purified either by a double treatment with NH_3 or by ionic exchange.
(C general, Sc)

84-C. (German.) **Continuous Recovery of Pure Ce Compounds in a Countercurrent Extraction Column.** Rudolph Bock and Karl-Heinz Meyer. *Chemie Ingenieur Technik,* no. 3, 1953, p. 141-142.

Apparatus for extraction of Ce^{+4} from HNO_3 solution of cerite earths.
(C general, Ce)

85-C. Ion Exchangers and Industry. Garson A. Lutz. *Battelle Technical Review,* v. 2, June 1953, p. 58-62.

Shows that ion exchange provides efficient and economical means for carrying on numerous manufacturing processes. Improvements in ion exchangers and their applications offer possibilities for wider uses in industrial, medical, and other fields. Use of ion-exchange methods for separation and reclamation of metals. Diagrams. (C28)

86-C. Alloy Pigs From Hogged Fuel. *Chemical Engineering,* v. 60, June 1953, p. 122, 124.

New electric smelting technique which uses lumber mill wastes to control temperature and produces metals from "unsmeltable" ores easily and cheaply. (C21, A8, S16, AY)

87-C. Developments in the Aluminium Reduction Industry. James Franses. *Industrial Chemist,* v. 29, May 1953, p. 214-219.

General requirements for the production of Al. A multi-anode reduction furnace. Technical developments in the industry are considered in some detail. Probable trends for future expansion indicated. Diagrams, photographs. (C22, Al)

88-C. Investigation of Treatment Difficulties at Retreatment Plant, Kookynie. Arnold Griffin, C. H. Meharry, and R. A. Hobson. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 532, May 8, 1952, 13 p.

Various cyanidation, leaching, and scheelite recovery tests on dump material. Tables. (C24, B14, Au)

89-C. Preparation and Properties of Iodide Vanadium. Julian W. Nash, H. R. Ogden, Richard E. Durtschi, and I. E. Campbell. *Electrochemical Society, Journal,* v. 100, June 1953, p. 272-275.

Describes the process; presents data on some of the physical properties and working characteristics. Tables, graphs, diagrams. 6 ref.
(C4, P general, Q general, V)

90-C. Review of Extraction Metallurgy. Graham Oldham. *Mining Journal* (London), Annual Review, May 1953, p. 93-97.

Considers Al, Mg, Cr, V, Ga, Ge, Au, Ni, Cu, Co, Ce, Th, Sn, Ti, U, Zn, and Zr. 30 ref. (C general)

91-C. Production and Uses of Germanium. J. A. Gay. *Chemical & Process Engineering,* v. 34, June 1953, p. 175-179.

A general discussion. British and American processes compared. 10 ref. (C general, T general, Ge)

92-C. Mechanization Program Results in Savings at Laredo Antimony Smelter. R. L. Kulpaca and J. C.

Archibald, Jr. *Journal of Metals,* v. 5, June 1953, p. 786-788.

Improvements made in the handling of products and consequent cost reduction. Photographs. (C21, Sb)

93-C. Chihuahua Slag Fuming Plant to Process 19,000 Tons Per Month. V. R. MacDonald. *Journal of Metals,* v. 5, June 1953, p. 789-790.

Plant for recovery of Zn from dump slag containing 10% Zn, at Chihuahua smelter. (C21, B21, Zn)

94-C. Vapor Pressure of Zinc in the Reduction of ZnS by Cu and Fe. A. W. Bethune and L. M. Pidgeon. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 804-807.

Equilibrium vapor pressure of Zn was determined by reacting the components in an evacuated tube containing a thin Cu fiber. Equilibrium was established between the brass formed and the Zn in the vapor phase. Composition of the brass formed was determined and equilibrium vapor pressure values obtained from existing data. 12 ref. (C26, P12, Zn, Cu, Fe)

95-C. Vacuum Furnaces for Melting or Processing of Metals. G. Jewett Crites. *Metal Progress,* v. 63, May 1953, p. 161-162, 164-166.

Reasons for new commercial importance of vacuum furnaces. Furnaces are described and classified by the type of heating used. Diagrams. (C25, D8, J general)

96-C. (German.) **Smelting and Casting Costs for Al and Its Alloys in Ingot Foundries.** H. Bohner. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 443-447.

Importance of induction furnace for smelting of light metals. Economic aspects are included. (C21, C5, Al)

97-C. (German.) **Modern Light-Metal Smelting Furnaces.** R. Tripmacher. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 448-449.

Described and illustrated. (C21)

98-C. (German.) **Technetium—Element 43.** J. C. Hackney. *Chemische Tecknik,* v. 5, no. 1, Jan. 1953, p. 17-22.

Preparation and chemical properties. Tables. 55 ref. (C general, P13, Tc)

99-C. (German.) **Observations on Formation of Slag by Passing an Air Current Through the Melt.** Helmut Hartmann, Wilhelm Hofmann, and Wolfgang Stahl. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 123-126.

Method to determine slagging. Factors affecting oxidizability of Pb alloys are emphasized. Graphs, tables. (C21, Pb)

100-C. Non-Ferrous Alloy Ingot Manufacture. W. G. Mochrie. *Foundry Trade Journal,* v. 94, June 4, 1953, p. 637-645; disc., p. 645-646.

Reviews preparation of ingots to specification for the founder. Raw materials, methods of treating, and plant construction. Check methods employed to guarantee uniformity of product and notes on the limitations of the processes. Photographs. (C general, EG-a)

101-C. Continuous-Cast Shapes. *Machine Design,* v. 25, June 1953, p. 129-130.

Process offers economies in design of Cu-alloy parts. Photographs. (C5, Cu)

102-C. A Specialized Method of Smelting Low-Grade Lead Ores. C. C. Downie. *Mining Journal,* v. 240, June 5, 1953, p. 671-672.

Smelting method which utilizes a gas-fired roasting furnace combined with a cylindrical sloping roaster. (C21, Pb)

103-C. The Extractive Metallurgy of Zirconium by the Electrolysis of Fused Salts. Background and Process Evolution. M. A. Steinberg, M. E. Sibert, and E. Wainer. Paper from Zirconium and Zirconium Alloys. p. 37-72. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Investigation of the production of Zr by the electrolysis of fused salt baths containing halides and double halides of Zr. Current and voltage controlling and recording equipment was designed and constructed so that accurate data could be obtained on the decomposition potentials of the halides utilized. Electrical characteristics of many electrolytes were investigated. Graphs, tables, micrographs. 61 ref. (C23, Zr)

104-C. Some Aspects of the Iodide, or Hot Wire, Process for Manufacture of Zirconium. W. M. Raynor. Paper from Zirconium and Zirconium Alloys. p. 73-81. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Work undertaken to determine rate-limiting factors and optimium operating conditions. Photographs. (C4, Zr)

105-C. The Manufacture of Zirconium Sponge. S. M. Shelton and E. Don Dilling. Paper from Zirconium and Zirconium Alloys. p. 82-120. 1953. Amer-

ican Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Major steps in the Mg-reduction process which include chemical purification, chlorination, reduction, vacuum distillation, sponge handling, and melting. Diagrams, photographs, tables. 23 ref. (C22, C26, Zr)

106-C. Present Production Status of Titanium. R. S. Radcliffe. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951. p. 5-16; P. B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Methods of producing Ti. Photographs, diagrams, tables. 16 ref. (C general, Ti)

107-C. (French.) **Ideas on the Formation of Melted Salts and the Theory of Igneous Electrolysis. Case of Aluminum. I. Cryoscopy in Melted Cryolite.** Maurice Rolin. *Journal du Four Electrique et des Industries Electrochimiques,* v. 61, no. 6, 1952, p. 157-160.

Raoult's law and experimental methods. (To be continued.) (C23, Al)

108-C. (German.) **Recent Patents.** E. Herrmann. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 166-169.

Brief abstracts of patents on the production of aluminum and silico-aluminum. Diagrams. 27 ref. (C general, Al)

109-C. (German.) **Amalgams of Manganese, Iron, Cobalt, Nickel, and Copper.** Franz Lihl. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 160-166.

Suspensions in Hg; structures of the Ni-Hg and Mn-Hg phases; and resistance of amalgams to oxidation were studied. Photographs, tables. 13 ref. (C29, Hg, Ni, Mn, Cu, Co)

110-C. (German.) **Intermittent Segregation in Pure Aluminum Continuous Casting.** Gustav Siebel, Dietrich Altenpohl, and Hans Michael Cohen. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 173-183.

An exudation on the surface of pure Al continuous cast blocks was investigated. Tables, photographs, figures. 11 ref. (C5, Al)

111-C. FluoSolids Reactor at Alcan's Arvida Plant Centrally Instrumented. *Canadian Chemical Processing,* v. 37, June 1, 1953, p. 42, 44, 46, 48.

Production of H_2SO_4 used in preparation of AlF_3 which is added to the bath in each reduction furnace. (C21)

112-C. Magnesium Production in the Southwest. W. J. Rave. *Electrochemical Society, Journal,* v. 100, July 1953, p. 179C-181C.

Plants for production of Mg from seawater. (C22, Mg)

113-C. The Aluminum Industry of the Gulf Coast Area. F. L. Kaestle. *Electrochemical Society, Journal,* v. 100, July 1953, p. 174C-178C.

Al production in the area, and alumina and Al reduction processes. Considers power requirements. Photographs. (C general, Al)

114-C. Research Reaps Rewards. Huge Alloy Plant to Produce Simplex Ferrochrome, Purer Cr and Mn. *Journal of Metals,* v. 5, July 1953, p. 886-887.

New plant to produce standard grades of ferrochrome, ferromanganese, and silicomanganese, and extra low carbon ferrochrome marketed under the name "Simplex", and electrolytic Cr and Mn. (C general, B22, Cr, Mn)

115-C. Metal Casting Methods. III. Continuous Casting. J. B. McIntyre. *Metallurgia,* v. 47, June 1953, p. 292-294.

Development and advantages of continuous casting. Method is widely used for Al alloys. (C5, Al)

116-C. Atomic Power Metal. A. H. Roberson. *Mining World,* v. 15, July 1953, p. 54-56.

Production problems, Kroll process, melting problems, properties, and possible uses of Zr. Photographs. (C26, T general, Zr, SS)

117-C. Vacuum Metallurgy Grows. Can You Use It? Allen G. Gray. *Steel,* v. 132, June 29, 1953, p. 88-91.

Advantages of vacuum melting in tests on Ti, Zr, Mo, cast steel, alloys, Pb, and Zn. Uses of arc-type and induction-type vacuum furnaces. Diagrams, photographs. (C25, D8, Ti, Zr, Mo, CI, Pb, Zn)

118-C. (English.) **On the Purification of Zirconium From Hafnium by Anion Exchange in Hydrochloric and Hydrofluoric Acid Mixtures.** Wilhelm Forsling. *Arkiv For Kemi,* v. 5, no. 6, 1953, p. 503-516.

Radiochemical investigation was made. Objective was to study possibility of purifying Zr from such amounts of Hf as generally occur with it in nature. Diagrams. 30 ref. (C2, Zr, Hf)

119-C. (French) **Electrolytic Dissociation of Alumina in Solution in Melted Cryolite.** Y. Doucet. *Journal de Chimie Physique et de Physico-Chimie Biologique,* v. 50, no. 1, Jan. 1953, p. 42-44.

A theoretical study. Tables, graphs. (C23, Al)

120-C. (French.) **Operating Conditions of Electrolysis Vats for Producing Aluminum With Low Contents of Alumina.** L. Ferrand. *Journal du Four Electrique,* v. 62, no. 1, Jan.-Feb. 1953, p. 15-17.

Includes diagram. 10 ref. (C23, Al)

121-C. (French.) **Metallurgy of Cobalt at the Union Miniere du Haut Katanga (Belgian Congo.)** *Journal du Four Electrique,* v. 62, no. 1 Jan.-Feb. 1953, p. 18-21.

Production of Co by hydrometallurgy and thermal refining. Photographs, tables. (C23, Co)

122-C. (French.) **The Future Development of Electrometallurgical and Electrochemical Industries in India.** *Journal du Four Electrique,* v. 62, no. 2, Mar.-Apr. 1953, p. 49.

The Central Electrochemical Institute, inaugurated Jan. 1953, envisages electrochemical exploitation of native Al, Mg, Pb, Na, Cl_2, calcium carbides, and special steels. (C general, D general, B10, Al, Mg, Pb, Na, ST)

123-C. Vacuum Dezincing of Desilverized Lead Bullion. T. R. A. Davey. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 991-997.

Evaporation processes, rate of distillation, practical application, a comparison with other theoretical work, precondensation and the distillation process. Graphs, tables. 16 ref. (C25, Pb, Zn)

124-C. Refining of Secondary Lead. P. H. Bootman. *Metal Industry,* v. 83, July 17, 1953, p. 51-52.

The Harris process. Tables. (C21, Pb)

125-C. (French.) **Investigations on the Electrolysis of Melted Aluminates.** Etienne Bonnier. *Annales de Physique,* v. 8, Mar.-Apr. 1953, p. 259-312.

Electrolysis of Na, Ca, Ba and Mg-aluminates. A chapter is devoted to each compound. Tables, graphs. 77 ref. (C23, Al)

126-C. (German.) **Extraction of Antimony by Volatilizing Roasting Concentrates Containing Noble Metals.** J. Szeki. *Acta Technica Academiae Scientiarum Hungaricae,* v. 3, nos. 3-4, 1952, p. 319-332.

Results of experiment. Tables. 6 ref. (C22, Sb)

127-C. (German.) **Copper Refining in Rotary Furnaces.** A. Geleji and J. Schey. *Acta Technica Academiae Scientiarum Hungaricae,* v. 3, no. 3-4, 1952, p. 393-425.

Advantages of short and long furnaces. Photographs, micrographs, graphs, tables, diagrams. 15 ref. (C21, Cu)

128-C. (German.) **Refining of Magnesium.** Karl Ernst Mann. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 264-266.

Reports that Fe, Si, Al, and Mn in varying degrees can be separated from Mg melts by Zr. Remaining Zr can be removed by H_2 or Cl_2. Mg thus refined is very corrosion resistant. Photographs, tables. (C28, R general, Mg)

129-C. (German.) **Precipitation of Chemically Pure Vanadium From the Gas Phase.** G. Jantsch and F. Zemek. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 157-159.

11 references. (C22, V)

130-C. (Portuguese.) **Development of Lead-Refining Metallurgy.** Tharcisio D. de Souza Santos. *Boletim da Associacao Brasileira de Metais,* v. 8, no. 29, Oct. 1952, p. 373-388.

Historical report. (C21)

131-C. Double Melting Produces Homogeneous Titanium Alloys. R. J. Van Thyne, D. H. Turner, and H. D. Kessler. *Iron Age,* v. 172, Aug. 6, 1953, p. 146-148.

Double arc-melting method. Diagram, photographs. (C21, Ti)

132-C. (French.) **Electrothermal Production of Castings.** M. Dabala. *Méttallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 447, 449, 451, 453, 455, 457-458, 461-463, 465, 467.

History of electric melting processes, comparison between various furnaces, chemical reactions in the electric blast furnace, general characteristics of slags and applications, electrical properties of the charge, and evolution of the furnace construction. Photographs, diagrams, graph. (C23, D5, Mg, Al, Cu, CI)

133-C. (German.) **Process for Producing Lead Alloys.** H. Kiessler. *Metall,* v. 7, nos. 11/12, June 1953, p. 442-444.

Production process for metallurgical soft Pb, hard Pb and printing metals Pb scrap and $PbSO_4$ which needs no oxidizing roasting. Tables. (C general, Pb)

134-C. (German.) **Oxidation Velocity of Antimony During Refining of Crude Lead.** P. Rontgen, W. Hilgers, and H. J. Gottschol. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 6, June 1953, p. 220-226.

Behavior of Sb under various oxidation conditions and under influence of Sn, As, Zn, Bi and Cu additions was tested between 750 and 800° C. Graphs, tables. 19 ref. (C21, Pb)

135-C. (Hungarian.) **Increasing Current Efficiency in Aluminum Electrolysis.** Gyula Szentivanyi. *Aluminium,* v. 5, no. 3, March 1953, p. 56-61.

Theoretical effect of temperature, current density, distance between anode and cathode, and composition of electrolyte upon current efficiency. Practical application of data in a Hungarian Al plant. (C23, Al)

136-C. (Hungarian.) **Possibilities for Extracting Rare Metals From the Raw Materials and Byproducts of Alumina Production. II.** Elemer Papp. *Aluminium,* v. 5, no. 3, March, 1953, p. 61-63.

Various methods. Importance of producing Ga and radiating Th in Hungary. (C general, Al, Ga, Th)

137-C. (Hungarian.) **The Processing of Liquation Residues.** Laszlo Jakoby. *Aluminium,* v. 5, no. 4, April 1953, p. 84-88.

Various methods and the Rau process. (C28, Cu, Pb, Sn, Sb)

138-C. (Hungarian.) **Experiments on the Extraction of Radioactive Material From Red Mud.** Kalman Méhes and Frigyes Macher. *Aluminium,* v. 4, no. 11, Nov. 1952, p. 262-263.

Experimental details. Measurements made with a beta-sensitive microcounter with graphite cylinder. Tables. (C general, S19, EG-h)

139-C. (Russian.) **Electrolytic Precipitation of Zinc-Cadminum Alloys.** N. T. Kudriavtsev and E. F. Pereturina. *Zhurnal Prikladnoi Khimii,* v. 26, no. 2, Feb. 1953, p. 155-159.

Dependence of the two metals in precipitation and influence of other factors. Corrosion data. Tables. (C23, R general, Zn, Cd)

140-C. Medium-Frequency Induction Furnaces in the Precious Metals Industry. F. von Burg. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 436-442.

Advantages which induction heating offers precious metals industry. Problems associated with crucible composition and melting technique. Special reference to unique features of the vacuum-melting process. Choice of operation frequency and size of generator and furnace. (C21, C25, EG-c)

141-C. Arc Melting as a Lab Tool. *Steel,* v. 133, Aug. 17, 1953, p. 168, 170, 172, 174.

Process and equipment as developed for melting of Ti and Zr. (C21, Ti, Zr)

142-C. Dollars From Dross. D. Hosie. *Canadian Metals,* v. 16, Aug. 1953, p. 14, 16.

New type of rotary crucible furnace for recovery of Cu alloys. Photograph. (C21, Cu)

143-C. How Northern Rhodesia Meets Rising Base Metal Demands. H. L. Talbot and F. H. Chapman. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 82-87.

Extraction processes for Co, Pb and Zn. Diagrams, photographs. (C general, Co, Pb, Zn)

144-C. Melting Systems for Aluminium. *Light Metals,* v. 16, Aug. 1953, p. 272-273.

Practices common in the Al industry for various forms of melting procedure. Melting for wrought products, scrap refining and production of castings, use widely differing techniques. Photograph. (C general, E10, Al)

145-C. Extraction Metallurgy. C. W. Dannatt and F. D. Richardson. *Metal Industry,* v. 83, July 24, 1953, p. 63-66.

Work on solubility of O in molten Pb, thermodynamics of PbO-SiO_2 and, FeO-SiO_2-CaO mixtures, behavior of S in silicate and aluminate melts and diffusion in solids. Graphs, photographs. (C general, D general, P12, Pb, S, Co, Fe)

146-C. Anhydrous Fluorides in Metallurgy. W. J. Kroll. *Metal Industry,* v. 83, July 31, 1953, p. 81-82; Aug. 7, 1953, p. 101-104; Aug. 14, 1953, p. 124-126; Aug. 21, 1953, p. 141-143.

Properties and chemistry of the fluorides; why they are applicable in metallurgy; production of various metal fluorides; examples; fluoride electrolysis. (C4)

147-C. Induction Furnaces. They Stir as They Melt Brass, Bronze. Frank T. Chesnut. *Steel,* v. 133, Aug. 24, 1953, p. 100-101.

Types, advantages and uses of induction furnaces. Table. (C21, Cu)

148-C. Vacuum Techniques in Metallurgy. W. J. Kroll. *Times Review of Industry,* v. 7, new ser; Aug. 1953, p. 26-28, 31.

Equipment for refining highly reactive metals. Diagrams. (C25)

149-C. Very Pure Metals. Advances in Chemical Technique. A. R. Powell. *Times Science Review,* Autumn 1953, p. 14, 16.

Chemical processes for extracting metals. (C general, D general)

150-C. (Hungarian.) **Recent Information on Matte.** Zoltan Horvath. *Aluminium (Budapest),* v. 5, no. 4, April 1953, p. 78-84.

Binary and ternary systems which play a role in refining metals from sulfide ores. Equilibrium diagrams. Diagrams, graphs. 4 ref. (C21, M24, Cu, Ni, Zn, Pb)

151-C. Vacuum Technique. S. L. Martin. *Chemical & Process Engineering,* v. 34, Sept. 1953, p. 276-279.

Vacuum pumps and gages, new techniques and production of Ta, Zr,

Mo and Ti. Diagrams, photographs. 35 ref. (C25, Zr, Mo, Ti, Ta)

152-C. Direct Process Boosts Yield. *Chemical Engineering,* v. 60, Sept. 1953, p. 158, 160, 161.

Bureau of Mines' direct chlorination process for preparing Hf-free Zr. (C4, Zr)

153-C. Preparation of "Mischmetall" by Thermal Reduction. C. Decroly, D. Tytgat, and J. Van Impe. *Electrochemical Society, Journal,* v. 100, Sept. 1953, p. 388-391.

Preparation by thermal reduction of mixed fluorides using Ca as reducing agent. Diagrams, table. 12 ref. (C26, EG-g)

154-C. A Study of the Electrodeposition of Ruthenium From Very Dilute Solutions. M. H. Lietzke and J. C. Griess, Jr. *Electrochemical Society, Journal,* v. 100, Oct. 1953, p. 434-441.

Behavior of Ru in low concentrations. A mechanism is proposed. Tables, graphs. (C23, Ru)

155-C. Preparation of Yttrium and Some Heavy Rare Earth Metals. A. H. Daane and F. H. Spedding. *Electrochemical Society, Journal,* v. 100, Oct. 1953, p. 442-444.

Method for preparing massive Y, Tb, Dy, Ho, Er and Tm by Ca reduction. Estimated melting points. 13 ref. (C26, P12, EG-g, Y, Tb, Dy, Ho, Er, Tm)

156-C. The Preparation and Properties of Magnesium Alloy Sheets of Controlled Impurity Content. H. G. Cole and B. Walters. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 25-31.

Preparation and rolling of ingots of three commercial types of Mg alloy sheet. Results of corrosion and mechanical tests on sheets. Tables. 9 ref.
(C5, F23, R general, Q general, Mg)

157-C. Anode Casting Operations at Garfield Smelter Geared to High Production. N. R. Alston and M. J. Winkel. *Journal of Metals,* v. 5, sec. 1, Sept. 1953, p. 1075-1077.

Holding furnace, anode casting wheels, inspection, molds and design. Photographs. (C5, Cu)

158-C. Titanium. New Melting Process Improves Yield and Quality. *Light Metal Age,* v. 11, Aug. 1953, p. 16.

Process and its advantages. Photograph. (C general, Ti)

159-C. Electric Smelting of Non-Ferrous Metals. A. G. E. Robiette. *Metal Industry,* v. 83, Aug. 28, 1953, p. 161-165.

Ni and Cu matte production and Sn, Pb, and Zn smelting. Diagrams, table, photograph. 9 ref.
(C21, Ni, Cu, Sn, Pb, Zn)

160-C. Development of Commercial Vacuum Furnaces for Melting Metals and Alloys. James H. Moore. *Metal Progress,* v. 64, Sept. 1953, p. 161-164, 166.

Development from World War I to present. Diagrams. (C25, D8)

161-C. (German.) **Chlorinating of Aluminum Alloys.** K. E. Mann. *Aluminium,* v. 29, no. 7-8, July-Aug. 1953, p. 297-298.

Amount of Cl ash resulting from treatment of Al alloy melts with gaseous Cl was used to test various refining agents for effectiveness and to compare nonmetallic impurities of various melts. Photograph, table. (C4, Al)

162-C. (German.) **Production and Working of Purest Aluminum.** Werner Helling. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 8, Aug. 1953, p. 310-317.

Fundamentals, techniques and uses. Photographs, graphs, diagrams, tables. 5 ref.
(C general, F general, Al)

163-C. (Hungarian.) **Possibilities of Extracting Rare Metals From the Basic and Supplementary Raw Materials of Alumina Production.** *Aluminium (Budapest),* v. 5, no. 2, Feb. 1953, p. 45-48.

Investigations in Hungary.
(C general, Ce, Zr, Ga, Be, Th, Al)

164-C. (Portuguese.) **Description of a Furnace, Constructed by the Institute for Technological Research in Sao Paulo, for the Vacuum Distillation of Zinc Contained in Zinc-Silver Alloys.** Tharcisio D. de Souza Santos. *ABM (Boletim da associacao brasileira de metalais),* v. 9, no. 30, Jan. 1953, p. 141-159.

Details of construction. Diagram, tables, photographs, graphs. 5 ref. (C22, Zn, Ag)

165-C. Flash Smelting Improves Harjavalta's Metallurgy. Fernando Benitez. *Engineering and Mining Journal,* v. 154, Oct. 1953, p. 76-80.

Smelting of Cu ores. Photograph, diagrams, graphs, tables. (C21, Cu)

166-C. Metal Melting Under Vacuum. *Foundry Trade Journal,* v. 95, Sept. 17, 1953, p. 365-367.

Mechanical problems associated with process and available solutions. Photographs, diagrams, graphs. (C25)

167-C. Continuous Casting of Copper Alloy Shapes. *Metal Industry,* v. 83, Sept. 18, 1953, p. 235-236.

Casting furnace and dies. Structure and quality of the castings.

Photographs, diagram, table. (C5, Cu)

168-C. Vacuum Melting Developments. *Metal Industry,* v. 83, Sept. 25, 1953, p. 263-264.

Recent developments in Switzerland. Graph, diagrams, photographs. (C25)

169-C. Accessories in Nickel Converter Practice. C. C. Downie. *Mining Journal,* v. 241, Sept. 25, 1953, p. 360-361.

Improvements now established in practice and others requiring further research. (C21, Ni)

170-C. (German.) **The Coreless Induction Furnace.** W. Scheibe. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 698-700.

Economic aspects and uses. Theoretical fundamentals. Diagrams, photograph. 11 ref. (C21, D6)

171-C. (German.) **Several Problems in High-Vacuum Metallurgy.** W. Scheibe. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 751-754.

Annealing, melting, sintering, distilling and sublimating methods of purifying metals. Special attention to melting of titanium by electric arc and suspension methods. Graphs, photographs, diagrams. (C25, J23, H15, Al, Cu, Fe, Ti, Ag, Pt)

172-C. (German.) **Melting Metals Without Contamination by Crucible Reaction.** Otto Winkler. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 333-341.

Arc melting and melting by induction using electromagnetic suspension or drip melting from a bar. Diagrams, photographs. 21 ref. (C21, Cu, Cr, Mo)

173-C. Magnesium Production. *Metal Industry,* v. 83, Oct. 9, 1953, p. 295-298.

Equipment, plant layout and procedures of only magnesium works in United Kingdom. Photographs. (C general, Mg)

174-C. Some Aspects of Vacuum-Melted Metal. J. H. Moore. *Metal Progress,* v. 64, Oct. 1953, p. 103, 105.

Advantages of refining metal under reduced atmospheric pressure. Graphs. (C25)

175-C. (Polish.) **Production of Lead-Calcium Alloys.** Z. Maslanka-Ormanowa. *Prace Instytutow Hutnictwa,* v. 5, no. 2, 1953, p. 89-104.

Methods of production. Tables, graphs. 9 ref. (C general, Pb)

176-C. (Portuguese.) **General Principles Used in Pyrometallurgical Processes of Tin Refining.** Tharcisio D. de Souza Santos. *ABM (Boletim de associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 199-218.

Separation of the aggregate phase, the liquids-solids separation and the refining processes based on differences in temperature, pressure and concentration. 16 ref. (C21, Sn)

177-C. (Portuguese.) **Practical Aspects of the Parkes Process for Separating Silver From Lead in the Refining Installation of the Institute of Technical Research.** Tharcisio D. de Souza Santos. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 219-234.

Three phases in which the above work is done. Equipment and technique. Tables, graphs. 7 ref. (C21, Pb, Ag)

SECTION D

FERROUS REDUCTION and REFINING

1-D. Going to Try a Basic Lining? Here's a Guide for Refractory Selection. J. P. Holt. *American Foundryman*, v. 22, Nov. 1952, p. 63-68.

Comprehensive discussion of basic refractories for steelmaking furnaces, cupolas, and crucibles. (D general, E10, ST)

2-D. Sulphur. Importance in the Iron and Steel Industry. E. C. Evans. *Iron & Steel*, v. 25, Nov. 1952, p. 495-500.

Reviews sources of S other than that mined in Texas and Louisiana. Use of S in blast-furnace practice, desulfurization outside the blast furnace, use in steelmaking, recovery from coke-oven gas, and recovery of H_2SO_4 from waste pickling liquor. 30 ref. (D general, A8, ST)

3-D. Pollution. Problems of the Iron and Steel Industry. R. J. Sarjant. *Iron & Steel*, v. 25, Nov. 1952, p. 501-502.

Discussion is confined to pollution problems associated with manufacture of iron and steel which arise from production of smoke, fumes, and dust in blast furnaces, sintering plants, melting plants, bessemer converters, and cupolas. (D general, A7, ST, Fe)

4-D. Developing Increased Capacity at Armco's Middletown Division. G. D. Tranter. *Iron and Steel Engineer*, v. 29, Nov. 1952, p. 90-96; disc., p. 96-97.

New installations at this plant, and sequence in which a program is being carried out to provide a good balance among steel melting, rolling, and finishing capacities. (D general, F23, ST)

5-D. The Attainment of Maximum Open Hearth Production. T. J. McLoughlin. *Iron and Steel Engineer*, v. 29, Nov. 1952, p. 123-129.

Care of furnace bottom and banks, maintenance of maximum furnace temperature, charging hot-metal additions, run-off slag and lime, working heat, tapping, instruments and controls, and care of furnace. Tables and graphs. (D2, CN)

6-D. Acid Open Hearth Bottom Practice. B. B. Rosenbaum. *Industrial Heating*, v. 19, Nov. 1952, p. 2102, 2104, 2106, 2108.

Effect of chemical composition and particle size of industrial silica sands for acid openhearth furnace banks and bottoms. Data are tabulated. (D2, ST)

7-D. Stainless Steel Melting Practices Have Changed. B. R. Queneau and A. C. Ogan. *Iron Age*, v. 170, Dec. 4, 1952, p. 165-169.

Innovations introduced in stainless melting in recent years. Despite material shortages, quality has improved and heat times have been reduced. Use of stainless scrap is not recommended in making 0.03% max. C stainless. By using ferrochromium pellets, 87-92% Cr recoveries are achieved and 3-4 hr. saved in heat times over the old practice. Tables and charts. (D general, B22, SS)

8-D. A Recent Development in Ingot Chariot Control. A. W. Leadbeater and R. B. Jamieson. *Journal of the Iron and Steel Institute*, v. 172, Nov. 1952, p. 264-267.

A solution to problem of damage to the ingot car system by ingots falling on the track and collector rails. Maintenance costs are greatly reduced, and repairs are simplified. (D9, ST)

9-D. Some Factors Affecting the Operation and Performance of Open-Hearth Furnaces. D. F. Marshall. *Journal of the Iron and Steel Institute*, v. 172, Nov. 1952, p. 315-326.

Evaluates some of the more important factors affecting the productivity and fuel consumption of openhearth furnaces. Properties of

principal available fuels. Relationship between slag bulk, rate of production per hour, and fuel consumed per ton was found to be highly significant. Aspects of furnace design, such as hearth size, uptake, and checker design. A basis for combustion control is discussed in detail, with special reference to the possible advantages to be gained from faster charging. Charts and tables. 14 ref. (D2, Fe)

10-D. Electric Smelting at Bureau of Mines Seeks Utilization of Northwest Ores. R. T. C. Rasmussen. *Journal of Metals,* v. 4, Dec. 1952, p. 1273-1279.

Electric smelting research facilities comprising batch-type arc melting furnaces and a pilot plant smelter with two open-top, pit-type furnaces for continuous smelting tests. Problems and results. Recent tests indicate promise for direct smelting of manganese silicates to produce silicomanganese, with high recovery of manganese. Other projects investigated included reduction of Oregon iron ore, production of ferro-columbium-tantalum from tin slag, and production of ferrochromium. (D5, C21)

11-D. Autopour Makes Steel Pouring Easier, Safer, Better. T. H. Hoby. *Journal of Metals,* v. 4, Dec. 1952, p. 1282-1283.

An electrically controlled hydraulic apparatus for fingertip control of the pouring of steel from ladles to molds. Photographs and diagrams. (D9, ST)

12-D. Production of Spiegeleisen From Open-Hearth Slag in an Experimental Blast Furnace. Russell C. Buehl and Miles B. Royer. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1289-1294.

A three-ton per day blast furnace using blast temperatures up to 2200° F. was operated to recover manganese from openhearth slag and manganiferous iron ore. The spiegel product contained 12 to 24% Mn. (D1, Fe-n)

13-D. (German.) **Large-Scale Melting Tests in Order to Determine the Coke Consumption for Remelting Pig Iron and Scrap in the Blast Furnace.** Cornelius Wens. *Stahl und Eisen,* v. 72, Nov. 6, 1952, p. 1391-1397.

Bibliography and planning of tests, operational results, and their interpretation. Converts data obtained to a common basis of operating conditions. Coke rate for scrap and pig iron, including granulated pig iron, is determined from comparable tests using a burden composed of ore exclusively. Tables. 13 ref. (D1, B22, Fe)

14-D. (German.) **The Distribution of Phosphorus Between Iron Melts and Saturated Slags in the Temperature Range 1530-1700° C.** Wilhem Anton Fischer and Hans vom Ende. *Stahl und Eisen,* v. 72, Nov. 6, 1952, p. 1398-1408.

Results compared with those obtained in the basic bessemer process. Relationships between O_2 contents of iron melt and slag and constitution of slags were determined. Tables, graphs, and micrographs. 26 ref. (D2, ST)

15-D. (German.) **Refining Basic Bessemer Pig Iron With Carbon Dioxide-Oxygen Gas Mixtures.** Karl Mayer, Helmut Knüppel, and Hans Jürgen Darmann. *Stahl und Eisen,* v. 72, Nov. 6, 1952, p. 1409-1418.

Blowing methods to produce rimmed steels having low N_2 contents. Storage plant for liquid CO_2 and evaporators; mixing CO_2 and O_2; blowing methods using CO_2-O_2 mixtures; N_2 and O_2 contents of steel; FeO contents of slag; properties of rimmed steels produced; and economic efficiency of the method. Diagrams, graphs, and tables. 17 ref. (D2, ST)

16-D. (Swedish.) **Desulfurizing in Basic Furnaces.** Torsten Collén and Stig Hollström. *Jernkontorets Annaler,* v. 136, No. 8, 1952, p. 317-361; disc., p. 361-374.

Desulfurizing in basic steel furnaces was studied statistically on 700 openhearth heats and experimentally in gas and oil-fired openhearth furnaces and in electric furnaces. The desulfurizing effect during refinement was mainly dependent upon basicity of slag. For reducing slags, no relation was found between ratio of S in slag and steel and basicity. Tables, graphs, and diagrams. 24 ref. (D2. ST)

17-D. The Attainment of Maximum Open Hearth Production. T. J. McLoughlin. *Blast Furnace and Steel Plant,* v. 40, Dec. 1952, p. 1435-1442.

Data from various openhearth shops are tabulated and charted. Care of furnace linings, effects of temperature and its control, charging and melting practices, instruments and controls, and a brief description of the "ideal heat". (D2, ST)

18-D. Continuous Casting Machine Will Soon Be in Operation at Welland. *Blast Furnace and Steel Plant,* v. 40, Dec. 1952, p. 1456, 1468.

The equipment and its advantages. (D9, ST)

19-D. Seventy-One Years of Blast Furnacing At South Works. Hershel E. Kaufman. *Blast Furnace and Steel Plant,* v. 40, Dec. 1952, p. 1457-1464.

Blast furnace equipment and operation at South Works in 1881, and developments to date. (D1, CI)

20-D. Recent Experience With Basic- and Acid-Electric Steel. L. W. Sanders. *Foundry Trade Journal,* v. 93, Nov. 27, 1952, p. 611-616.

Changeover from small basic-lined electric furnace to balanced production from modern basic and acid-lined electric furnaces at a British plant. Particulars of new plant, together with details of linings, melting processes and degree of uniformity and reproducibility obtained. Photographs, diagrams, and charts. (D5, ST)

21-D. Studies in the Deoxidation of Iron. Deoxidation by Silicon. E. Ll. Evans and H. A. Sloman. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 296-300.

Preparation, microscopic examination, and analysis of a series of ingots containing various quantities of iron oxide and Si. Includes X-ray and chemical analysis of the nonmetallic residues. Inclusions may consist of two immiscible glasses, or of fayalite together with magnetite and wüstite. Photomicrographs show the various types of inclusion. The results are discussed briefly in relation to Gokcen and Chipman's recent investigation of equilibrium in molten iron. (D general, M27, Fe)

22-D. (German.) **Determination of the Heat Losses of Blast Furnaces by Measuring the Cooling Water Volume.** Alfred Send and Franz Strähuber. *Stahl und Eisen,* v. 72, Nov. 20. 1952, p. 1509-1513.

Report No. 266 of the Blast Furnace Committee of the Verein Deutscher Eisenhüttenleute. Heat losses at various sections with both fireclay and carbon brick linings were measured. Data are tabulated and charted. 10 ref. (D1)

23-D. (German.) **Factors Affecting the Life of Basic Converter Linings.** Walter Eilender and Josef Schoop. *Stahl und Eisen,* v. 72, Nov. 20, 1952, p. 1513-1521.

Report No. 514 of the Steelworks Committee of the Verein Deutscher Eisenhüttenleute. Effects of grain size of liner materials, spalling phenomena, tar characteristics, and compacting force. Charts and diagrams. 12 ref. (D3)

24-D. (German.) **The Analysis of Operating Procedures as a Basis for Measures to Improve Productivity of Iron and Steel Works.** Martin Förster. *Stahl und Eisen,* v. 72, Nov. 20, 1952, p. 1524-1531.

Report No. 239 of the Committee for Industrial Management of the Verein Deutscher Eisenhüttenleute. A study was made of the iron and steel industry and its development since the second world war. Essentials of operational analysis. Charts and tables. (D general, S12)

25-D. (Book.) **Iron and Steel.** 147 pages. June, 1952. Anglo-American Council on Productivity, 21 Tothill St., London S.W. 1, England; or 2 Park Ave., New York 16, N. Y.

Processes of iron and steelmaking; labor, services, and finance. Relative productivity in U. S. and Britain.
(D general, F general, A4, A6, Fe, ST)

26-D. (Book.) **Iron and Steel Works of the World.** H. G. Cordero, editor. 651 pages. 1952. Quin Press, Ltd., London.

Comprehensive and global review of important plants producing pig iron, raw steel, rolled iron and steel, flat steel, tinplates, etc.
(D general, F23, Fe, ST)

27-D. Charging Open Hearth Furnaces. C. Croxford. *British Steelmaker,* v. 18, Dec. 1952, p. 692-694, 709.

Study of scrap processing and furnace charging procedures in Northern France and Germany. Suggests ways to improve charging facilities in British openhearth melting shops. (D2, ST)

28-D. Furnace Trends in Design and Operation. Frank H. Slade. *Iron and Steel,* v. 25, Dec. 1952, p. 523-526.

Latest developments in blast furnaces, cupolas, rotary furnaces, high frequency furnaces, fume removal, and furnace control.
(D general, E10)

29-D. Injection of Oxygen-Reformed Natural Gas and Fuel Oil Into the Blast Furnace. Julien O. Raick and James E. Brassert. *Iron and Steel Engineer,* v. 29, Dec. 1952, p. 75-80.

Above procedure would double the output of existing blast furnace units and decrease coke rates to about one-half present values. Data are tabulated. (D1, Fe)

30-D. Heating Up Open Hearth Furnaces After Rebuilding. *Iron and Steel Engineer,* v. 29, Dec. 1952, p. 113-117. (Based on a paper by Hobert M. Kraner and Charles N. Jewart.)

Developments at Lackawanna plant of Bethlehem Steel Co.
(D2, ST)

31-D. Timken Replaces Open Hearths With Electric Furnaces. *Iron and Steel*

Engineer, v. 29, Dec. 1952, p. 139-140, 142, 145, 147.

Comprehensive discussion. Photographs. (D5, ST)

32-D. Continuous Casting Makes Steady Progress. *Steel*, v. 131, Dec. 22, 1952, p. 79, 82.

Developments by Republic Steel Corp. and Babcock & Wilcox Co. Recognition and control of six fundamental factors is the path to success for the much-discussed method. (D9, ST)

33-D. Smelting Kuji Iron Sand by the Krupp-Renn Process. Kenji Kuwada. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 188-198.

Economic and technical reasons for the success of the Krupp-Renn process at Kuji and properties of products. Data are tabulated. (D8, Fe, CN)

34-D. The Use of Combustion Models in Open-Hearth Furnace Studies. A. H. Leckie. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 206-220.

Results obtained on openhearth combustion models set up and operated by British Iron and Steel Research Association. Effects of air-to-fuel ratios, furnace pressures, and port design on heat transfer. Tables and charts. (D2)

35-D. Operation of a Burner-Type Open Hearth. Iwao Murata. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 235-240.

Design changes and operational results of converting an openhearth from mixed gas to cold coke-oven gas. Diagrams and tables. (D2)

36-D. Cockerill Company's Experience With the Perrin Process. J. Janvier, M. Nepper, and J. Levaux. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 241-246.

Experiences of John Cockerill Societe Anonyme, Seraing, Belgium, with the Perrin desulfurization process for basic openhearth steel. Furnace linings and deoxidation. (D2, ST)

37-D. A Proposed Steel Making Process. Alessandro Reggiori. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 256-259.

Scrap melting furnace and advantages of its use in conjunction with openhearths. (D2, ST)

38-D. The Effect of Small Aluminum Additions on Alloy Steel. Mario Signora. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 260-267.

Effect of small additions of Al made in the mold on Ni-Cr structural steel. Specimens taken from ingots were subjected to fracture and macroscopic tests while mechanical properties and McQuaid-Ehn tests were made on forgings. Tables and diagrams. (D9, M28, Q general, AY)

39-D. A Statistical Analysis on the Formation of Corner Cracks in Steel Ingots. Adolfo Antonioli. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 298-320.

Rapid pouring and high pouring temperature were found to be cause of cracks in carbon steel. Data are tabulated and charted. (D9, CN)

40-D. Basic Electric Arc Steel Versus Acid Open Hearth Steel for Roller Bearings. Bengl Kjerrman. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 502-505.

Causes of failures and relation to melting practice. Low N_2 content of acid openhearth steel makes it superior to basic electric. (D2, D5, T7, ST)

41-D. Turbo-Blowers in Blast-Furnace Plants. M. Haller. *Brown Boveri Review*, v. 39, May/June 1952, p. 189-199.

Important features of new axial-flow blower when used as a blast-furnace blower. (D1)

42-D. The Brown Boveri Turbo-Blower in Large Steelworks. *Brown Boveri Review*, M. Haller v. 39, May/June 1952, p. 200-206.

Conventional steelmaking processes in so far as they affect design of turbo-blower. (D general)

43-D. Atlas to Continuously Cast Steel Billets, Slabs. *Canadian Metals*, Dec. 1952, p. 18-19.

Process at Atlas Steels Limited, Welland, Ont., by which 10-15% more finished steel per heat than conventional pouring methods yield will be obtained. (D9, ST)

44-D. Economics of Iron and Steel Melting. Ralph L. Melaney. *Industrial Gas*, v. 31, Dec. 1952, p. 13, 20-24.

Procedures and costs of two gas-fired reverberatory furnaces, and a general description of openhearth firing. (D2, ST)

45-D. Pacific Northwest Steel Plant in Commercial Operation. Robert C. Hill. *Steel*, v. 131, Dec. 29, 1952, p. 88, 90.

Electric furnace now melting carbon steel for 4x4-in. billets will

shortly be scheduled on alloy and stainless grades at Seidelhuber Steel Rolling Mill Corp., Seattle. Photographs. (D5, CN, AY, SS)

46-D. Timken Modern Electric Arc Furnace Features Original Inductive Stirrer Installation. *Steel Equipment & Maintenance News,* v. 5, Dec. 1952, p. 8-9.

Brief description. (D5, ST)

47-D. Carbon Refractories for Blast Furnaces. John J. Hazel. "Yearbook of American Iron and Steel Institute", 1952, p. 309-351, disc., p. 352.

Experiences at various steel companies. Gas analyses were made from holes drilled at various locations to determine extent to which steam oxidizes the carbon blocks near the tap hole and cinder notch. Results of tests on different carbon raw materials and commercial grades of carbon blocks. Design of carbon hearths. Diagrams, tables, and graphs. Bibliography of 84 ref. (D1, Fe)

48-D. (French.) **Operation of Metallurgical Furnaces "Without Air."** Luis Pottecher. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 811-814; disc., p. 814.

A study was made on the possibilities of operating blast furnaces with a CO_2-CO-O_2 mixture instead of air. Furnace design and advantages of the process. (D1, Fe)

49-D. (Swedish) **Söderberg Electrodes for Electric Steel Furnaces.** T. Wahlberg and N. Winblad. *Jernkontorets Annaler,* v. 136, No. 9, 1952, p. 377-411.

Investigations were made at three Swedish steel works. Coking temperatures for various pastes were determined. Causes of electrode breakage, manufacturing methods and care. Diagrams, tables, and graphs. (D5)

50-D. Size Distribution as a Quality Factor of Blast-Furnace Coke. J. Taylor and J. D. Gilchrist. *Engineering,* v. 174, Dec. 19, 1952, p. 805-807; Dec. 26, 1952, p. 838-840.

General discussion. Graphs and tables. (D1)

51-D. Rammed and Castable Refractories Find Increased Steel Plant Use. R. Russell Fayles. *Journal of Metals,* v. 5, Jan. 1953, p. 34-38.

Use for lining openhearth furnaces. Photographs. (D2)

52-D. Use of Oxygen in the Production & Processing of Iron & Steel. W. E. Krebs. *Journal of Scientific & Industrial Research,* v. 11A, Nov. 1952, p. 490-496.

Use of O_2 in welding and cutting surface treatment of iron and steel, in blast furnaces, in low shaft furnace, in openhearth heating, and in refining pig iron. 47 ref. (D general, K general, B22, CI, ST)

53-D. Vanadium—The Possibility of Its Production From Indigenous Sources. J. Sandor. *Metallurgia,* v. 46, Dec. 1952, p. 268-274.

Suggests carrying out iron and steelmaking operations for better extraction of V from the slag. Tables and diagrams. 11 ref. (D general, C21, V)

54-D. Recent Experiences With the Smelting of Iron Ores in a Low-Shaft Furnace. E. Killing. Henry Brutcher Translation 2938, 13 pages.

Previously abstracted from original in *Stahl und Eisen.* See item 348-D, 1952. (D8, Fe)

55-D. (German.) **Research on Solubility Relationships of Phosphoric Acid in Basic Bessemer Slag.** Siegfried Gericke. *Stahl und Eisen,* v. 72, Dec. 4, 1952, p. 1580-1583.

Effects of SiO_2 content on the solubility of P_2O_5 was studied on 330 samples. Data are tabulated and charted. 6 ref. (D3)

56-D. (Italian.) **Examination at the End of the Campaign of the Lining of an Open-Hearth Furnace Cooled With Fuel Oil.** G. Ziliani and G. Grungo. *La Metallurgia Italiana,* v. 44, Oct. 1952, p. 518-525.

Chemical, microscopical, and technological tests. Tabulated data. Micrographs. (D2)

57-D. (Book—German.) **(Blast Furnace Slags.) Hochofenschlocke.** Fritz Keil. 346 pages. 1952. Verlag Stakleisen, m.b.H., Dusseldorf, Germany. 32.50 DM.

Vol. 7 of the Stahleisen-Bücher series. Manufacture, properties, and applications of blast-furnace slags. (D1, Fe)

58-D. Progress at Republic Steel Corporation With the High Pressure Blowing of Blast Furnaces. John C. Murray. *Blast Furnace and Steel Plant,* v. 41, Jan. 1953, p. 49-55.

General discussion. (D1, CI)

59-D. Induction Stirrer Applied to Electric Furnaces by Timken. *Blast Furnace and Steel Plant,* v. 41, Jan. 1953. p. 57-62.

Electro-magnetic induction stirrer and other features of Timken's new electric arc furnaces. (D5, ST)

60-D. Production of Controlled Density Steel in Kilns. P. E. Cavanagh. *British Clayworker,* v. 61, Jan. 15, 1953, p. 298-301.

Production and uses. 4 ref. (D8, ST)

61-D. Low-Shaft Blast Furnace. *Iron & Steel,* v. 26, Jan. 1953, p. 5-9.

(Translated from *Revue Universelle des Mines,* No. 10, Oct. 1952.)

Direct advantages of the use of low-shaft furnace. (D1, Fe)

62-D. Sponge Iron at Anaconda. Frederick F. Frick. *Mining Engineering,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 196, 1953, p. 83-84.

Production method. Shows that sponge iron has proved satisfactory both technically and economically. (D8, Fe)

63-D. (German.) **Treatment of Liquid Open-Hearth Steel With Solid Electric-Furnace Slag and the Metallurgical Process During Tapping.** Heinz Siegel. *Archiv für das Eisenhüttenwesen,* v. 23, Nov.-Dec. 1952, p. 417-425.

Reactions in the ladle were examined and ways were determined for letting such reactions occur between time of tapping and of casting into ingots without decrease of purity. (D2, D9, ST)

64-D. (German.) **Desulfurization of Pig Iron With Acid Slags.** Georg Erne. *Mitteilungen,* v. 11, Jan.-June, 1952, p. 1-71.

Synopsis of current theories and results of experiments on reduction of oxygen partial pressure; addition of free Al, Si, and Mg; and treating the melt in a high vacuum. Three requirements of good gaseous desulfurization are listed. Graphs and tables. 84 ref. (D1, CI)

65-D. (Italian.) **Factors Affecting the Formation of Surface Defects on Killed, Medium-Carbon Steel Ingots for Sheets.** Mario Signora and Guido Camolese. *La Metallurgia Italiana,* v. 44, Nov. 1952, p. 560-567.

A study was made on 2000 ingots. Effects of chemical composition, mold size and shape, pouring temperature, rising speed of the metal, type of pouring, and mold preparation. Photographs and charts. (D9, CN)

66-D. Metallurgy and Economics of Oxygen Enrichment When Refining Steel in the Converter. R. Graef. Henry Brutcher, Translation 2887, 20 pages.

Previously abstracted from *Stahl und Eisen.* See item 24-D, 1952. (D3, CN)

67-D. (French.) **Influence of the Rate of Operation of Iron and Steel Mills on Their Fuel Consumption.** M. Moinet. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 59, 4 pages.

General discussion. Graphs. (D general, ST)

68-D. (French.) **Comparison of Open-Hearth and Arc Furnaces for Production of Steel.** Boutigny and Barbazanges. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 121, 4 pages.

Includes tabular data. (D2, D5, ST)

69-D. (French.) **Properties and Utilization of Blast-Furnace Gas.** J. Szczeniowski. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 164, 8 pages.

Smoke-producing and burning powers, specific heats, and combustion temperatures. Graphs. (D1)

70-D. Melting Practice and Refractories Performance in Basic Electric-Arc Furnaces. M. P. Fedock. *Industrial Heating,* v. 20, Jan. 1953, p. 135-136, 138, 140.

Effect of different melting techniques for O_2-blown, high and low-carbon alloy steels, and stainless steel, on humidity in furnace atmosphere. (D5, AY, SS)

71-D. Factors Influencing Surface Quality of High Sulfur Steels. George G. Blean. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 79-81; disc., p. 82-83.

Mold conditioning, mold design, track time, heating, and rolling. Graphs. (D9, F21, F23, ST)

72-D. Assessment of Skin Thickness of Rimming Ingots. S. J. Smith. *Journal of the Iron and Steel Institute,* v. 173, Jan. 1953, p. 16-18.

By examination of a series of 60 steel ingots, it is shown that major factors governing skin thickness of rimming ingots seem to be teeming rate and rimming characteristics. Table and graphs. (D9, CN)

73-D. Accelerated Solidification in Ingots. Its Influence on Ingot Soundness. Edgar Marburg. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 157-172.

Most ingots complete solidification vertically rather than transversely. Conclusion is based on complete solidification patterns of big-end-up and big-end-down carbon steel ingots developed from dumped and split ingots. New mechanisms for segregation in ingots are proposed. Internal soundness in ingots is found to depend upon adequate width of vertical core. Photographs and graphs. 14 ref. (D9, CN)

74-D. Reduction of Silicon From Blast Furnace Type Slags. James C. Fulton, Nicholas J. Grant, and John Chipman. *Journal of Metals,* v. 5, sec.

1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 185-190.

Contains data on distribution of Si between liquid Fe-Si-C alloys saturated with respect to graphite and CaO-SiO_2-Al_2O_3 slags under 1 atm. of CO at 1600° C. Ranges of slag compositions studied were extended from dicalcium silicate saturated liquidus composition up to silica concentrations at which SiC appeared as a stable phase. Tables and graphs. 10 ref. (D1, Fe)

75-D. Progress in Steelmaking Processes in America. John S. Marsh. *Metal Progress,* v. 63, Jan. 1953, p. 74-77.

General discussion appraising standard steelmaking processes and possible future improvements. (D general, ST)

76-D. Postwar Progress and Trends in Steel Manufacture in the Benelux Region. Achille G. Lefebvre. *Metal Progress,* v. 63, Jan. 1953, p. 84-88.

Raw materials; plant rehabilitation; recent improvements in basic bessemer processes. (D3, ST)

77-D. (French.) Desulfurization of Cast Iron and Dephosphorization of Basic Bessemer Steels by Soda Slags. Francis Meunier. *Revue de Métallurgie,* v. 49, Dec. 1952, p. 855-861; disc., p. 861-862.

Experiments were made on ladle and converter treatments with various slags. Data are tabulated and charted. 13 ref. (D1, D3, CI, CN)

78-D. (French.) New Process of Making High Quality, Killed Basic Bessemer Steel. F. Meunier and R. Soisson. *Revue de Métallurgie,* v. 49, Dec. 1952, p. 876-882; disc., p. 882.

Process in which steel is transferred to a second converter at the end of the desulfurizing blow. Properties of four steels with C content from 0.05-0.48%. 13 ref. (D3, Q general, CN)

79-D. Australia's Largest Blast Furnace Completed at Australian Iron & Steel Ltd., Port Kembla. *Australasian Engineer,* Dec. 8, 1952, p. 43-47.

Describes and illustrates the furnace. (D1, Fe)

80-D. The Production of High Purity Iron by Direct Reduction From the Ore. Details of the Duffield Method of Smelting. J. E. Ferry. *Australasian Engineer,* Nov. 7, 1952, p. 70-73; Dec. 8, 1952, p. 48-52.

The Duffield Process for production of sponge Fe. Includes a heat balance table. (D8, Fe)

81-D. Water Failures on Blast Furnaces. Harold Goldfein. *Blast Furnace and Steel Plant,* v. 41, Feb. 1953, p. 209-212.

Various causes and how to handle them. (D1)

82-D. A Revolution in Iron-Making? Oxygen Enrichment and the Blast Furnace. Max Davies. *Discovery,* v. 14, Feb. 1953, p. 61-63.

Principles of blast-furnace operations. Diagrams. (D1)

83-D. Design—A Limiting Factor in the Life of Open-Hearth Furnace Refractories. J. H. Chesters. *R. fractories Journal,* v. 29, Jan. 1953, p. 2-9.

Discusses such design objectives as heat release rates, super-refractories, convection heating, flow pattern control, and heat losses in cooling water. Photographs. 14 ref. (D2)

84-D. Blast Furnace Charging. *Times Review of Industry,* v. 7, Feb. 1953, p. 24-25, 27.

System of electrically controlled conveyors. Photographs. (D1)

85-D. Geochemistry and Refractories. E. F. Osborn. *Industrial Heating,* v. 20, Feb. 1953, p. 330, 332, 334, 336, 338, 340. (Extracts.)

Describes and evaluates refractories for use in the steel industry. (D general, ST)

86-D. Ingot Heat Conservation. L. H. W. Savage and R. T. Fowler. *Journal of the Iron and Steel Institute,* v. 173, Feb. 1953, p. 119-128.

Method by which heat transfer from a steel ingot can be determined by using the mold as a calorimeter. Graphs show how results can be applied to reduce track and heating times of ingots. Graphs and tables. 11 ref. (D9, ST)

87-D. Flicker Control in Arc Furnace Power Supply. R. F. Lawrence and R. L. Tremaine. *Steel,* v. 132, Feb. 23, 1953, p. 102, 105, 108, 111; Mar. 2, 1953, p. 96, 98, 100, 102, 105-106, 108-109.

Methods for determining voltage flicker in electric furnace power system, and an interpretation of results in terms of established light flicker limits. Information which can be used to evaluate any reasonable combination of synchronous condenser and buffer reactor, and effect of furnace size for any system impedance. (D5)

88-D. Silicon Content of Blast Furnace Iron Lowered by Oxygen Injection in Ladle. P. S. Leroy. *Journal of Metals,* v. 5, Mar. 1953, p. 396-400.

Considers O_2 for C reduction, decarburizing vs. desiliconizing, desiliconizing at blast furnace runner, and O_2 injection in transfer ladles. Diagrams. 9 ref. (D1, Fe)

89-D. Rimming Steel Production Rate Studied by Multiple Correlation. W. W. Black and C. R. Taylor. *Jour-*

nal of Metals, v. 5, Mar. 1953, p. 401-403.

Study of factors affecting production rate in 70-ton electric furnaces. Graphs. (D5, ST)

90-D. The High Top-Pressure Blast Furnace. E. L. Pepper. *Metal Progress,* v. 63, Feb. 1953, p. 71-73.

Operation of blast furnace at elevated top-pressures offers easy and economical way to increase pig iron production. Flue dust rate and manufacturing cost of pig iron are decreased. (D1, CI)

91-D. Recent Improvements in Electric Steelmaking. S. W. Poole. *Metal Progress,* v. 63, Feb. 1953, p. 110-112, 196, 198, 200, 202.

Notes on fume control, gas-heated hot tops, rare-earth metals for deoxidizers, "auto-pouring" of ingots, and substitute sources of Cr for low-carbon stainless steels. Report of 10th Electric Furnace Steel Conference of AIME. (D5, ST)

92-D. The Use of Gaseous Oxygen in Electric Steel Making. R. B. Halsey. *Australasian Engineer,* Jan. 7, 1953, p. 66-69.

Development of oxygen blowing for the refining of electric steel. Increased production and technological advantages. Photographs. 13 ref. (D5, SS)

93-D. High Top-Pressure Blast-Furnace Operation. I. Lockerbie. *Engineering,* v. 175, Feb. 27, 1953, p. 267-268.

Compares performance of two blast furnaces with respect to coke used per week, $CO:CO_2$ ratio, output, slag volume, and top pressure. (D1, Fe)

94-D. Ironmaking. Part I. A Review of Progress in the Process, 1939-1952. Part II. Energy Balance and Efficiency of the B. F. Process. John Taylor. *Iron & Steel,* v. 26, Feb. 1953, p. 39-43; Mar. 1953, p. 87-90.

Present knowledge of some major aspects of ironmaking processes with particular reference to progress made since 1939. Part II: Theories of blast furnace process, and determination of efficiency. 75 ref. (D1, Fe)

95-D. Effects of Basic Oxides Upon the Desulfurization in the Blast Furnace. Parts I and II. B. Weilandt, H. Maetz, and W. Oelsen. Henry Brutcher Translations 2950 and 2951. 23 and 17 pages.

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 303-D, 1952. (D1, Fe)

96-D. Continuous Casting of Steel by the Junghans Process. K. G. Speith and A. Bungeroth. Henry Brutcher Translation 2970, 30 pages.

Previously abstracted from *Stahl und Eisen.* See item 325-D, 1952. (D9, ST)

97-D. New Oxygen Steel-Melting Practice Developed in Austria. (The LD Process). Henry Brutcher Translation 2996, 2 pages. (From *Metallurgie und Giessereitechnik,* v. 2, no. 5, 1952, p. 173.)

Process in which high-purity O_2 is blown through an air-cooled nozzle onto metal in converter, imparting a circulatory motion to the bath. Data on steel types, scrap charges, slag volume, dust production, and blowing time. (D3, Fe)

98-D. (French.) **Controlling Apparatuses of Blast Furnaces.** Paul Thierry. *La Métallurgie et la Construction Mécanique,* v. 84, Dec. 1952, p. 919, 921.

A brief study of controlling apparatus necessary for the efficient operation of a blast furnace. (D1)

99-D. (French.) **Pressure and Flow of the Blast in Blast Furnaces.** Paul Thierry. *La Métallurgie et la Construction Mécanique,* v. 85, Jan. 1953, p. 15-16, 19.

Factors affecting pressure of the blast. (D1)

100-D. Electrolytic Process With Promise. Erich Konrad. *Chemical Engineering,* v. 60, Apr. 1953, p. 189-192.

Process which produces pure, dense, ductile iron sheets directly from $FeCl_2$ solution by means of graphite anodes and stainless steel cathodes. (D8, Fe)

101-D. Segregation. Major Cause of Flakes in Alloy Gun Steels. J. B. Gero and A. R. Troiano. *Iron Age,* v. 171, Mar. 26, 1953, p. 133-137.

Investigation in which SAE 4340 blooms and forgings were tested shows that flaking is probably a direct result of dendritic segregation. Graphs. 22 ref. (D9, N12, AY)

102-D. Temperature Distribution in Carbon Hearths. R. D. Westbrook. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 141-144.

Determination of optimum hearth thicknesses for blast furnaces and effective cooling tehcniques. Diagrams. (D1)

103-D. Activities of Constituents of Iron and Steelmaking Slags. Part I. Iron Oxide. E. T. Turkdogan and J. Pearson. *Journal of the Iron and Steel Institute,* v. 173, Mar. 1953, p. 217-223.

Shows that for a given iron oxide concentration, small proportions of silica increase the activity of FeO

and larger proportions decrease it. Graphs and tables. 18 ref. (D general, B21, Fe)

104-D. Don't Write Off the Blast Furnace. Charles E. Agnew. *Steel,* v. 132, Mar. 16, 1953, p. 110, 113, 116, 118, 121, 124, 128, 131, 134; Mar. 23, 1953, p. 86, 88, 91, 92; Mar. 30, 1953, p. 92, 94, 97-98, 100, 102, 104, 107; Apr. 6, 1953, p. 146, 148, 151-152, 155-158.

Part I: Development and advantages of present designs. Part II recommends changes to permit use of O_2-enriched blast and discusses principles, theories, and specifications. Part III questions use of O_2-enriched blast for a hanging furnace. Shows that CO_2 in blast is detrimental. Part IV: Success of O_2-enrichment is affected by variations in raw material, thermal requirements, and operating practice. (D1, ST)

105-D. Distribution of Oxygen Between Metal and Slag in the Basic Open-Hearth Furnace. B. V. Stark and E. V. Chelishchev. Henry Brutcher Translation 2878, 13 pages. (From *Trudy Moskovskogo Instituti Stali im. I. V. Stalina, Symposium XXX "Structure and Properties of Steel",* Metallurgizdat, Moscow, 1951, p. 70-84.)

Experimental data from 21 basic openhearth heats. (D2, Fe)

106-D. Performance Data on Electric Arc Furnaces With Shell Diameters of Over 12 Feet. F. Badenheuer. Henry Brutcher Translation 2940, 18 pages.

Previously abstracted from *Stahl und Eisen.* See item 210-D, 1950. (D5, ST)

107-D. Refining of High-Chromium Steel Heats in the Arc Furnace With Pure Oxygen. R. Fischer. Henry Brutcher Translation 2947, 30 pages.

Previously abstracted from *Stahl und Eisen.* See item 60-D, 1950. (D5, B22, AY)

108-D. (German.) **Efficiency of Blast Furnaces and Development of the Large Blast Furnace.** Eduard Senfter. *Stahl und Eisen,* v. 72, Dec. 18, 1952, p. 1633-1642.

Design and use of small and large blast furnaces; coke consumption per ton of iron ore as a standard of measurement; coke charge and iron yield by the Möller process; and capacity data for large blast furnaces. Tables and graphs. 8 ref. (D1, Fe)

109-D. (German.) **Blowing of Bessemer Pig Iron With the Open Jet.** Carl V. Schwarz. *Stahl und Eisen,* v. 72, Dec. 18, 1952, p. 1642-1652.

Cooling with mill scale is effective and results in a good yield of iron from the ore. Use of O_2 jet is as efficient as blowing through tubes immersed in a bath. Graphs and tables. 10 ref. (D3, Fe)

110-D. (German.) **Computing Basic Costs in the Iron Industry with Special Regard for Blast Furnace Installations.** Gottfried Prieur and Otto-Max Petersen. *Stahl und Eisen,* v. 72, Dec. 18, 1952, p. 1665-1671.

Minimum requirements, comparative presentation for blast-furnace works, sources of error, and determination of monthly requirements. Tables. (D1, Fe)

111-D. (German.) **On the Refining of Bessemer Pig Iron With Pure Oxygen.** Friedrich Alfred Springorum, Karl Georg Speith, and Willy Oelsen. *Stahl und Eisen,* v. 73, Jan. 1, 1953, p. 6-22.

Experimental procedure; peculiarities of the reaction; results of adding scrap and ore; N_2 content of the steel; slag formation; behavior of P and Mn; O_2 content of the bath; and economic considerations. Graphs and tables. 59 ref. (D3, CN)

112-D. The Casting of Ingots for Seamless Tube Making. G. Bowman. *Engineering,* v. 175, Feb. 27, 1953, p. 286-287; Mar. 20, 1953, p. 381-338.

Teeming speed, cracking, cavitation, crusting, and porosity. (D9, F26, CI)

113-D. Successes and Failures in Sponge Iron Manufacture. *Metal Bulletin,* Mar. 17, 1953, p. 9-12.

Methods for preparation. (D8, Fe)

114-D. Sponge Iron. P. E. Cavanagh. *Metal Progress,* v. 63, Mar. 1953, p. 67-69.

Production in Mexico and Sweden, increasing demand, and cost. (D8, Fe)

115-D. (Swedish.) **Reaction Products Formed at Contact Surface Between Liquid Steel and Fireclay Brick.** T. Wahlberg and L. Fredholm. *Jernkontorets Annaler,* v. 137, no. 1, 1953, p. 1-25.

Analytic and microscopic examinations on isolated reaction products. (D general, ST)

116-D. (Book—Russian.) **Electric Melting Furnaces for Ferrous Metallurgy.** N. V. Okorokov. 563 pages. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Covers variations of arc and induction furnaces. Tables and diagrams describe details ranging from mathematical theory for electrical characteristics to information on furnace construction. (D5, ST)

117-D. (Book—Russian.) **Hydrogen and Nitrogen in Steels.** A. N. Morozov. 222 pages. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Coverage is principally for wrought steel, and considers only thermal treatments. Includes data on gas analyses for the acid open-hearth and flake formation. (D general, ST)

118-D. New Use for Tunnel Kilns. Steel Production. *Brick & Clay Record,* v. 122, Apr. 1953, p. 74-75, 83.

Shows that steel can be produced from ore without change in design or operation of a 2000 to 2200° F. operating kiln. Photographs. (D8, ST)

119-D. Automatic Control of Open-Hearth Furnaces. *Engineer,* v. 195, Mar. 27, 1953, p. 456-458.

Process for controlling maximum roof temperature and furnace pressure and for automatic reversal of the furnace by operation of a reversal switch. Photographs. (D2, S16)

120-D. Towards More Pig Iron. Cargo Fleet New No. 1 Blast Furnace. *Iron & Steel,* v. 26, Mar. 1953, p. 81-86; Apr. 1953, p. 129-133.

Plant layout and equipment for crushing, grading, sintering, coking, and smelting. Charging equipment, controls, and electrical features. Diagrams and photographs. (D1, B16, Fe)

121-D. Ironmaking. Part III. Gas-Solid Reactions. Part IV. Modifications of the Blast Furnace Process. John Taylor. *Iron & Steel,* v. 26, Apr. 1953, p. 122-127.

Reduction of Fe oxides by CO. Melting processes include electrosmelting, oxygenated blast, and low-shaft furnace using a briquetted charge. 66 ref. (D1, Fe)

122-D. Physically Hot Iron Preferred for Open Hearths. Donald M. Morrison. *Journal of Metals,* v. 5, Apr. 1953, p. 522-524.

Production of hot metal for direct use in openhearth furnaces. Presents review of published opinion on the subject. Tables. 13 ref. (D2, ST)

123-D. Arc Melting for the Foundry. New Birlec Installation at Hadfields. *Metallurgia,* v. 47, Mar. 1953, p. 126-128.

Furnace features. Photographs. (D5)

124-D. (French.) **Electric Purification of Blast-Furnace Gas.** Leclerc. *Circulaire d'Informations Techniques,* v. 10, no. 2, 1953, p. 315; disc., p. 315-317.

Brief discussion. (D1)

125-D. (French.) **Advances in the Methods of Treating High Silicon Basic Bessemer Iron With Pure Oxygen.** P. Leroy. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 57-71; disc., p. 71.

Introducing O_2 below the surface while filling the ladle and blowing on the surface after filling. (D3, Fe)

126-D. The All-Basic Open Hearth Furnace in Britain. David D. Howat. *Blast Furnace and Steel Plant,* v. 41, Apr. 1953, p. 391-396.

Compares basic and silica brick and discusses furnace roof design, types of basic bricks used, defects experienced in chrome-magnesite bricks, factors in all-basic furnace performance, fuel problems, and new developments in basic bricks. Diagrams. (D2)

127-D. Pig Iron by the Krupp-Renn Process. *British Steelmaker,* v. 19, Apr. 1953, p. 186-187.

Advantages and disadvantages of the process. (D8, CI)

128-D. Steelmaking Behind the Iron Curtain. Rumania. John Cardew. *British Steelmaker,* v. 19, Apr. 1953, p. 197-199.

With Russian aid, the Rumanian iron and steel industry is being modernized and re-equipped to produce 1,252,000 metric tons of steel annually by 1955. Some developments completed and planned. (D general, ST)

129-D. Reduction of Hanging and Slipping in Blast Furnaces by Automatic Control. Otto J. Leone. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 55-72.

Factors related to hanging, channeling, and slipping. Develops logical selection of a new control method to detect and correct furnace irregularities in accordance with the concepts outlined. Diagrams, graphs, and photographs. (D1)

130-D. Application of Automatic Combustion Controls to a New Open Hearth Shop. F. S. Swaney. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 111-117; disc., p. 117-118.

Features of the new shop. Photographs and diagrams. (D2, ST)

131-D. Iron Ore Recovered From Blast Furnace Gas. W. A. Walton. *Iron and Steel Engineer,* v. 30, Apr. 30, 1953, p. 121-122.

A blast furnace flue dust recovery plant which provides complete re-

covery of high iron-content dust. Photographs. (D1, A8, Fe)

132-D. Progress Report on Carbon Blast Furnaces. T. J. Wilde and V. J. Nolan. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 127-128.

Brief resume of the service record of National Carbon blast furnace linings, recent trends in use and design, and a detailed discussion of the current approach toward improved service. (D1)

133-D. Bethlehem's Johnstown Plant. A Century of Pioneering. T. J. Ess. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. J1-J20.

Development of the plant; its source of raw materials; coke plants; blast furnaces; openhearth; blooming and billet mills; plate mills; merchant mills; rod and wire mill; and miscellaneous manufacturing departments. Tables, photographs, and diagrams.
(D general, F general, ST)

134-D. American Iron and Steelmaking Practices Compared With British. *Metal Progress,* v. 63, Mar. 1953, p. 170, 172, 174, 176, 178, 180; Apr. 1953, p. 138, 140, 142, 144, 162, 164.

Condensed by E. C. Wright from the Productivity Report, "Iron and Steel", June 1952, 147 pages, published by Anglo-American Council on Productivity. Presents a chapter-by-chapter review comparing U. S. and British steelmaking practices. (D general, ST)

135-D. (French.) **Disintegration of Ores.** J. Bebatty. *Circulaire d'Informations Techniques,* v. 10, no. 2, 1953, p. 291-302.

A review of experimental work on the investigation of breaking up of ore particles in the blast furnace. (D1)

136-D. Firebricks in the Iron and Steel Industry. G. Reginald Bashforth. *Claycraft,* v. 26, Apr. 1953, p. 302-305.

Use of bricks in blast furnace linings, blast stoves, cupola linings, openhearth furnace doors, and casting pit refractories. (D1, D2)

137-D. Induction Stirrer Improves Quality of Steel. Eric G. Malmlow and Quentin Graham. *Steel,* v. 132, May 4, 1953, p. 104, 107, 110.

Use of low-frequency power results in suitable speed of magnetic field over surface of bath and its deep penetration into molten metal in electric furnace. (D5, ST)

138-D. Coke Oven Gas as a Supplementary Open Hearth Fuel. Richard D. Bundy. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 32-53.

Tests and results. Previous difficulties of using irregular amounts of low-pressure gas were overcome by the use of a suitable burner, maintenance of a gas-line pressure of 13.5 psi., and a minimum firing rate of 30,000 cu. ft. per hr. Graphs, tables, and photographs. (D2)

139-D. Checker Maintenance to Increase Flame Intensity. L. A. Hovey. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 54-56; disc., p. 56-59.

Problems of checker volume; amount of air available relative to fuel input; insulation and sealing; and cleanliness of checkers. (D2)

140-D. Use of Oxygen for Flame Enrichment and Decarburization, Inland Steel Company. A. M. Kroner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 59-65.

Expansion and development of installations for the use of O_2. Tables and photographs. (D2, B22)

141-D. Oxygen for Increasing Open Hearth Production, Gary Steel Works. Wiley C. Buford. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 66-70; disc., p. 70-71.

Use of O_2 for decarburization to obtain increased production from existing facilities. Graphs. (D2, B22)

142-D. Scrap Preparation and Influence of Distribution Methods on Charging Time. William F. Bowers. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 72-74.

Shows that by proper scrap preparation and close coordination of distribution methods, charging time at the openhearth can be materially decreased. (D2, B22)

143-D. Decreasing Charging Time by Preparing Scrap. Vernon W. Jones. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 75-77; disc., p. 77-79.

Scrap-preparation program. (D2, B22)

144-D. Rammed Fantails for Open Hearth Furnaces. R. R. Fayles. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 80-86.

Rammed installation, objectives of

change, and improved performance. Diagrams and photographs. (D2)

145-D. Plastic Refractories in Nose and Fantail of Slag Pockets on Open Hearth Furnaces. W. E. Haberthur. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 87-88; disc., p. 88-90.

Installation and results. (D2)

146-D. Construction of Open Hearth Flues. J. C. Witherspoon. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 90-92.

Details of construction and results of using refractory concrete. (D2)

147-D. Concrete Refractories for Open Hearth Flues. R. E. Wright. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 92-93; disc., p. 93-94.

Construction. (D2)

148-D. Survey of Zebra Roofs in Use in the United States and Canada. T. H. Harley. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 94-97; disc., p. 97.

Survey made to determine extent, type, and results of the use of zebra roofs employed up to the present time. (D2)

149-D. Recent Experience With Rammed Hearths at Bethlehem. H. M. Kraner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 97-102.

Graphic information on the performance of several high-magnesia openhearth bottoms. (D2)

150-D. Comments on Rammed Bottoms. W. E. Brandt. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 103-104.

Compares rammed to sintered bottoms. (D2)

151-D. Scheduling and Planning Furnace Repairs. J. L. Walton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 104-105.

Shows that planning repair programs two months in advance increases production and efficiency. (D2)

152-D. Scheduling Open Hearth Rebuilds. J. O. Dague. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 106-110; disc., p. 110-113.

Schedule which covers every detailed operation of a repair job, from the time the furnace is tapped to the time the fuel is turned on. (D2)

153-D. Linings for Hot-Metal Mixers. R. E. Aikins. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 114-116.

Results experienced under actual operating conditions. (D2)

154-D. Refractory Lining for Hot-Metal Mixer. F. R. Smith. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 116-117.

Efforts to prolong life of hot-metal mixer lining. (D2)

155-D. Conservation of Alloys. D. L. McBride. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 118-128.

Conservation of Ni and Mn. (D2, B22, Ni, Mn)

156-D. Use of Exothermic Alloys. C. C. Brown. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 129-131.

Reviews uses and applications in steelmaking. Tables. (D2, Mn, Cr)

157-D. Methods of Adding Boron to Open Hearth Heats. E. W. Pierce. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 132-133; disc., p. 133-135.

Method and effects of adding boron. (D2, B22, B)

158-D. Manganese for the Steel Industry—a Review. Francis W. Boulger and Russell C. Buehl. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 135-138; disc., p. 138-139.

Review of Mn recovery methods. 10 ref. (D2, Mn)

159-D. Use of Manganese Sulphide to Improve Hot-Workability. S. Feigenbaum. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 139-140; disc., p. 140-141.

Improved rolling characteristics of free-machining steels when S is added in the form of manganese sulfide. (D2, CN)

160-D. Effect of Manganese Sulphide and of Stick Sulphur on Surface Quality of Steel. Delmar R. Bessler. *American Institute of Mining and Metallurgical Engineers, Open*

Hearth Proceedings, v. 35, 1952, p. 141-142.

General discussion on resulfurized steel. (D2, CN)

161-D. Open Hearth Bath Deoxidation. M. Tenenbaum. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 166-172; disc., p. 173.

Reviews changes occurring during bath deoxidation in order to determine what factors were responsible for persistence of the practice in spite of objections to its use. Tables. 7 ref. (D2)

162-D. Slag Control in Cold Metal Practice With the Use of Burnt Lime. Wilt H. Steinheider. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 174-187; disc., p. 188-189.

Effect of slag chemistry on slag patties and the changes the slag makes on individual heats. Graphs, tables, and photographs. (D2)

163-D. Economics of the Use of Oxygen With a Cold Charge. A. H. Sommer. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 190-194.

Economics of the use of O_2 by saving time and fuel when normal furnace operations can supply enough steel to satisfy normal rolling-mill requirements. Graphs. (D2)

164-D. Oxygen Lancing Practice in Cold Metal Shops. Alex Bigar, Jr. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 195-198; disc., p. 198-200.

Use of O_2 as an aid in increasing the output of steel from openhearth furnaces conducted on an experimental basis. Tables. (D2, B22, ST)

165-D. Effect on Production of High Percentage of Pig Iron (+40 Per Cent) in Cold Metal Practice. A. R. Edwards. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 200-201; disc., p. 201-202.

General discussion of effect. Tables. (D2, B22)

166-D. Supercharging a Battery of Open Hearth Furnaces. Albert Calderon. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 212-220; disc., p. 220.

Mechanics of system, component parts, charging cycle, and savings. Diagrams. (D2)

167-D. New Developments in Burners for Liquid or Combination Liquid and Gaseous Fuels. W. H. Kahl. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 221-226.

Data on mixed-fuel practices. Tables. (D2)

168-D. New Developments in Firing Combination Liquid and Gaseous Fuel. E. T. W. Bailey. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 226-230; disc., p. 230-233.

Discusses plant expansion which includes new coke ovens underfired with blast furnace gas. Diagrams. (D2)

169-D. Sulphur in Residual Fuel Oils. C. F. Kottcamp. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 233-241; disc., p. 241-244.

Chemical and mechanical difficulties of removing sulfur. Graphs, tables. (D2, B18)

170-D. Significance, Factors Affecting, and Methods of Measuring Preheated Air Temperature. Henry S. Hall. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 244-250; disc., p. 250-253.

General description of raising preheat temperature. Graphs. (D2)

171-D. Instrumentation at the Open Hearth, Crucible Steel Company. Lester W. Moore and Herman E. Meek. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 253-256.

Automatic pressure and fuel-air ratio control; and automatic reversal. Diagrams. (D2, S18)

172-D. Some Instrumentation Functions on the New Open Hearth Furnaces, Jones and Laughlin Steel Corporation. R. A. Lambert. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 257-265.

Roof-temperature control and automatic reversal. Photographs. (D2)

173-D. Atomizing Oil With High-Pressure Natural Gas. L. D. Yager. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 266-267.

Effect on refractories and furnace efficiency. (D2, B18)

174-D. Designing a Furnace to Use Natural Gas. H. C. Barnes. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 267-280.

Method of studying flow lines by the use of small-scale cold models

using air carrying a paint spray fog to determine the flow lines. Diagrams. (D2)

175-D. Effect of Uptake Dimensions on Furnace Performance, Inland Steel Co. L. R. Berner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 281-283.

Experience with basic ends, multiple burners, and restricted uptakes. Graphs. (D2)

176-D. Effect of Uptake Dimensions on Furnace Performance, Steel Company of Canada. J. E. Hood. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 283-285; disc., p. 285-286.

General discussion of furnace performance. (D2)

177-D. Effect of Liberian Ore on Open Hearth Production. R. P. Carpenter. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 307-308; disc., p. 308-309.

Characteristics and chemical reactions of ore. (D2, B22)

178-D. Use of Moroccan Ore at Fairfield Steel Works. C. C. Benton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 310-311; disc., p. 311.

Physical characteristics and chemical analysis. (D2, B22)

179-D. Experience in Indefinite Banking at Inland. Josef S. Kapitan and Michael Slifko. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 497-502.

Fundamentals of the banking method used by the blast furnace department at Inland Steel Co. Discusses steps in chronological order. (D1)

180-D. Lone Star Steel Company Operations. W. R. Bond. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 508-513.

Types of iron ore used; beneficiation and sintering plants; coal and coke; ovens; and blast furnace. (D1, B general, Fe)

181-D. Results Obtained on Ensley Blast Furnaces Following Installation of High-Pressure Turboblowers. J. J. Shannon. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 5-23; disc., p. 23-24.

Furnaces, equipment, and results obtained. Graphs, tables. (D1)

182-D. Operating With Leone's Differential Pressure Control at Neville Island Blast Furnace. L. W. Adams, Jr. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 24-28; disc., p. 28-40.

Mechanics of the operation. Graphs. (D1)

183-D. Experience With Conditioned Blast at the Woodward Iron Company. H. A. Byrns. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 41-44; p. 45-49.

Investigation to determine what benefits might be attained by the use of conditioned air in the manufacture of merchant pig iron. Tables. (D1, Fe)

184-D. Multiple Correlation of Blast Furnace Variables. R. V. Flint. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 49-68; disc., p. 68-73.

Application of multiple correlation to blast-furnace problems. Shows that it is only one of many analysis methods and should be supplemented by other techniques wherever this will lead to a better overall solution. Tables. (D1, S12)

185-D. The Krupp-Renn Process, a Direct Process for Siliceous Iron Ores. Friedrich Johannsen. *Blast Furnace, Coke Ovens and Raw Materials Proceedings,* v. 11, 1952, p. 75-88; disc., p. 88-92.

The Renn process is particularly suitable for treating siliceous iron ores which could not be economically treated either in the blast furnace or by the usual dressing operations. Process has low handling costs and does not employ metallurgical lump coke. Graphs. photographs. (D8, Fe)

186-D. Operation of an Experimental Blast Furnace. Russell C. Buehl and Miles B. Royer. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 111-120; disc., p. 120-124.

Extensive pilot-plant tests involving the operation of a 3-ton per day blast furnace and a 600-lb. basic converter to recover Mn from open-hearth slags. Diagrams, tables. (D1)

187-D. Distribution of Manganese Between Slag and Metal Under Reducing Conditions. J. E. Stukel and J. Cocubinsky. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings,* v. 11, 1952, p. 124-131; disc., p. 131-137.

Investigation to study the equilibrium distribution of Mn between blast-furnace-type slags and iron saturated with carbon. Graphs, tables. (D1, Fe)

188-D. Blast Furnace Burdening for Coke of Varying Qualities. Charles M. Squarcy. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings*, v. 11, 1952, p. 137-143; disc., p. 143-144.

Study to determine maximum amount of foreign coke that can be used compatible with uniformity of product. Graphs, tables. (D1)

189-D. Some Present Views of Refractories for Blast Furnace Linings. J. A. Pierce and Raymond E. Birch. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings*, v. 11, 1952, p. 145-152; disc., p. 152-157.

Progress report on trends in blast furnace refractories. Photographs. (D1)

190-D. Some Recent European Improvements in the Field of Coke Ovens, Blast Furnaces, Stoves, and Low-Temperature Distillation. Daniel Petit. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings*, v. 11, 1952, p. 202-211; disc., p. 211-213.

Free-expansion oven, Cowper stoves of varying turbulence, a new device for charging blast furnaces, and present situation of low-temperature distillation in Europe. Diagrams, photographs. (D1)

191-D. A Comparison of Blast Furnace Operations With and Without Coke Produced From Pennsylvania Low-Volatile Coals. W. C. M. Bennett. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings*, v. 11, 1952, p. 241-245; disc., p. 245-246.

Practical results, on a group of furnaces, of the use of coke whose quality was improved through application of blending method. (D1, B18)

192-D. Physical Conditions in the Combustion and Smelting Zones of a Blast Furnace. J. F. Elliott, R. A. Buchanan, and J. B. Wagstaff. *Blast Furnace, Coke Ovens, and Raw Materials Proceedings*, v. 11, 1952, p. 246-262; disc., p. 262-266.

Investigation of the combustion region by using a high-speed camera with a maximum speed of 3000 frames per sec. Diagrams, graphs. 9 ref. (D1)

193-D. Ironmaking. Part V. Slag/Metal Reactions. John Taylor. *Iron and Steel*, v. 26, May 1953, p. 155-160.

Role of S, Si, Mn, and P in iron making. Reduction of iron oxide and effects of N_2, and C in iron. 67 ref. (D1, Fe)

194-D. Expansion at Shotton. New Developments at John Summers & Sons, Ltd. *Iron and Steel*, v. 26, May 1953, p. 175-182, 187.

Major units which were installed. Includes coal handling and blending plant; coke-ovens and by-product plant; blast furnace plant; blowing and power station; and new steel-melting shop. Photographs. (D general, B18, ST)

195-D. Induction Stirrers. Profitable Use for Electric Arc Furnaces. P. E. Hammarlund. *Iron and Steel*, v. 26, May 1953, p. 188-190.

Construction of the stirrer and its advantages. Diagrams. (D5, ST)

196-D. Atlantic Steel Using Cold Metal Charge Finds Costs in Favor of Electric Furnace. J. E. Wilbanks. *Journal of Metals*, v. 5, May 1953, p. 627.

Briefly compares openhearth and electric furnaces. (D2, D5, ST)

197-D. Metallic Oxidation in Chromium Steel Melting. D. C. Hilty, G. W. Healy, and Walter Crafts. *Journal of Metals*, v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 649-653.

By means of a theoretical extension of the Cr-C temperature relation in molten Cr steels and by a correlation of the ratios of Cr to Fe in the slag and metal, a method was developed for estimating amount of metallic oxidation during the oxidizing period of a Cr steel heat. Tables and graphs. (D general, AY)

198-D. Production of Commercial Blast Furnace Slag. Fred Hubbard. *American Concrete Institute, Journal*, v. 24, Apr. 1953, *ACI Proceedings*, v. 49, 1953, p. 713-719.

Types of blast furnace slag produced commercially; geographic availability; extent to which slag produced at blast furnaces is commercialized; usual chemical composition; and production procedures which differ from those of other aggregates. 15 ref. (D1, B21)

199-D. Electric Ore Smelting Passes Tests. H. S. Newhall. *Steel*, v. 132, May 11, 1953, p. 144, 147.

Experimental results and advantages of making steel from ore in a duplex electric furnace operation. Photographs. (D5, ST)

200-D. Operation Seraphim. Appleby-Frodingham's Campaign for More Iron. *Times Review of Industry*, v. 7, May 1953, p. 30.

Project to increase the output of pig iron. Construction of blast furnaces, blowing equipment, crushing plant, and sinter machines. (D1, B13, B16, CI)

201-D. Welded Blast-Furnace Skip Bridge. *Welding and Metal Fabrication*, v. 21, May 1953, p. 175-176.

Tubular structure used to solve space problem in building skip bridge. Photographs. (D1, K general, CN)

202-D. (German.) **Modern Design of a Blast Furnace.** Willi Dehne. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 222-224.

Walls consist of a Cu profile tube wound to inner and outer spirals. These can be water-cooled by flow in either direction. Head is built as an individual part and cooled separately. (D1)

203-D. (German.) **Operation of Low-Shaft Blast Furnace.** Heinz Schumacher. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 257-266.

Effect of O_2 enrichment and blast temperature on heat available in the furnace. Compares operation results when ferromanganese is produced both with and without addition of O_2. Diagrams. (D1, Fe, Mn)

204-D. (German.) **Problem of Mixer Life.** Alfred Latour and Josef Schoop. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 266-272.

Effects of heating up, slag composition, and control practice on the life of mixer linings. Photographs. (D2)

205-D. (German.) **Development of Blast Furnace Gas Cleaning During the Last Ten Years.** Kurt Guthmann. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 283-292.

Reviews practices in Germany, U. S. A. and England. Various phases of primary and final cleaning. Diagrams, tables. (D1)

206-D. (German.) **Behavior of Nitrogen in Basic Bessemer Steel Heats With Different Cooling Before Conversion.** Willy Oelsen and Hans Jürgen Därmann, *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 338-346.

Reaction process with various N, Mn, and P contents. Relationship between dephosphorization during preblowing and N content. Graphs. (D3, ST)

207-D. (Italian.) **Ingot Mold Design and Ingot Quality.** F. Borelli. **Temperature and Solidification Rate and Ingot Quality.** G. Camolese. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 56-68.

Two reports and a discussion on their relationship. Graphs. (D9, Fe)

208-D. Heating-Up Open Hearth Furnaces After Rebuilding. Hobart M. Kraner and Charles N. Jewart. *Industrial Heating,* v. 20, Mar. 1953, p. 547-548, 550, 552, 554; May 1953, p. 959-960, 962, 964, 966, 968.

Part I outlines tests and actual shop trials used to develop fastest safe heating-up rate for silica-brick roofs. Part II covers heat-up assembly developed for the openhearth burner and presents results of a survey of heating-up times in the industry. (D2, F21)

209-D. Construction of Low-Shaft Blast Furnace Nears Completion. *Iron Age,* v. 171, May 21, 1953, p. 133-137.

Furnace built to utilize low-grade ore which will make 60 to 100 tons of iron per day. (D1, CI)

210-D. (German.) **Treatment of Raw Iron and Steel With Slag as an Agent for Improvement of Steel.** Eduard Senfter. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 1-10.

Tests on heating of blast furnaces and steel-plant slags showed that an S-poor, hot slag is obtained which can desilicize, desulfurize, and overheat the crude iron. Tables, diagrams, graphs. 3 ref. (D general, B21, CI)

211-D. (German.) **Vibration Methods for Manufacture of Converter Linings.** Alfred Latour and Josef Schoop. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 81-84.

Mechanical and chemical wear of converter bottoms and decreasing of pore volumes. Various vibrators and their operation. Test data with Sinex vibrators using 400, 800, and 2000 watts. Graphs, photographs. (D3)

212-D. (German.) **Operational Results With Fire-Clay Ladle Bricks of Different Types When Pouring Soft Open-Hearth Steel.** Karl-Otto Zimmer. *Stahl und Eisen,* v. 73, no. 7, Mar. 26, 1953, p. 411-415.

Production tests were made on 17 types of ladle bricks and the data compared with laboratory results. Graphs, tables. (D9, Fe)

213-D. (Book.) **American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,** (Annual Volume), v. 35, 1952. 342 p. National Open Hearth Committee, Iron and Steel Division, AIME, Room 905, 29 West 39th Street, New York 18, New York.

Individual papers, separately abstracted, covering acid and basic openhearth practice from high hot-metal charge to low-iron or cold-charge operations. (D2)

214-D. (Book.) **Blast Furnace, Coke Oven, and Raw Materials Proceedings, American Institute of Mining and Metallurgical Engineers, Iron and Steel Division.** (Annual Volume), v.

11, 272 p., 1952. AIME, 29 West 39th St., New York 18, N. Y.

Papers and discussions on important factors in the progress of the steel industry. Papers abstracted separately. (D1)

215-D. Steel Expands in the Detroit Area. At Rotary Electric Steel Co. Robert Sergeson. **At Great Lakes Steel Corp.** H. L. Klinker. **At Ford Motor Co.** A. Krause. *Iron and Steel Engineer,* v. 30, May 1953, p. 114-118.

Extensive expansion and improvement programs under way in the Detroit area. (D general, AY)

216-D. New Blast Furnace Gas Cleaning Facilities at Donora. S. P. Kinney. *Iron and Steel Engineer,* v. 30, May 1953, p. 139-140, 142.

Describes program which eliminates air and stream pollution from blast furnace operation. (D1)

217-D. From the Ore to the Ingot. James Mitchell. *Iron and Steel Institute, Journal,* v. 174, pt. I, May 1953, p. 1-8.

Existing practices in the industry. (D general, Fe)

218-D. The Water-Cooling of Open-Hearth Furnaces. A. M. Frankau. *Iron and Steel Institute, Journal,* v. 174, pt. I, May 1953, p. 46-52.

Series of measurements were made of flow rate and temperature rise of cooling water supplied to the individual cooling units in a number of openhearth furnaces. Tables. (D2)

219-D. (French.) **Effects of Cyanides on the Disintegration of Blast Furnace Shafts.** M. Logeling. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 10, no. 3, 1953, p. 465-490.

A study on the role of intermediate cyanide compounds formed in the hearth on the erosion of the lining. Tables. (D2)

220-D. Utilization of Electricity in Iron and Steel Works. W. F. Cartwright. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. I, May 1953, p. 126-131.

From the point of view of a mechanical engineer and a steelworks operator. Graphs, tables. (D general)

221-D. Lorain Cuts Banked Blast Furnace Blowing-In Time From 72 to 30 Hours. Walter W. Durfee. *Journal of Metals,* v. 5, June 1953, p. 791-793.

Method of converting the tapping hole into a tuyere for reducing blowing-in time. Graphs. (D1)

222-D. Steam Jets Efficiently Remove Dust From Open Hearth Furnace Flues. John Peterson. *Journal of Metals,* v. 5, June 1953, p. 794-795.

Steam jet system for removing flue dust from flues underneath the checkers. Photographs. (D2, A5)

223-D. Pig Iron Smelting in Low-Shaft Furnaces. *Metal Progress,* v. 63, May 1953, p. 210-212, 214.

Condensed by E. C. Wright from "Pig Iron Smelting Without Metallurgical Coke", by W. W. Krebs and D. Jagat Ram, *India Institute of Metals, Transactions,* v. 5, 1951, p. 51-76. Reviews production of pig iron with the Krupp-Renn, Stuerzelberg, Lohse and various low-shaft blast furnaces which were investigated in Sweden, Italy, and Germany during the last 15 years. Process for making pig iron in a somewhat complex furnace arrangement wherein a cheap coal and iron ore mixture is given a presmelting reduction treatment in a rotary kiln similar to that used in the Krupp-Renn process. (D1)

224-D. West Coast Pig Iron Boosted 50% as Kaiser Blows in Third Blast Furnace. *Western Metals,* v. 11, June 1953, p. 48-49.

Increase of pig iron to 1,314,000 tons annually. New furnace consumes only 1400 lb. of coke per net ton of iron produced, compared to a national average of 1600 to 1700 lb. (C1, CI)

225-D. Use of Rare-Earth Metals and Compounds in Stainless Steel Melting. C. B. Post and H. O. Beaver. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 627-634, 645.

Investigation of the effects of mischmetal in arc-melted austenitic stainless steels. Photographs, tables. (D5, B22, SS)

226-D. Expanded Blast Furnace Slag for Use as Light Weight Concrete Aggregate. R. W. Miller. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 635-638, 645.

Processes used in manufacturing expanded slag. Various applications. Photographs. 7 ref. (D1, T5)

227-D. The Testing and Development of Basic Refractories for the Open Hearth. L. W. Austin. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 639-645.

Construction of a laboratory furnace in which various forces can be applied simultaneously. Results of test designed so destructive influences can be controlled. Photographs. (D2)

228-D. Some Aspects of Merchant Iron Furnacing. A. J. Macdonald. *Blast*

Furnace and Steel Plant, v. 41, June 1953 p. 646-650, 655.

Plant facilities and operation. Photographs. (D1)

229-D. Removable Open Hearth Slag Pocket Bulkhead Doors. Ray E. Over. *Industrial Heating*, v. 20, June 1953, p. 1120, 1122, 1124, 1126.

Design and use of a removable bulkhead to facilitate removal of slag from openhearth slag pockets. Photographs. (D2)

230-D. Titanium Can Replace Manganese for Sulfur Control of Steel. J. D. Roach and R. S. Stewart. *Iron Age*, v. 171, June 4, 1953, p. 150-153; June 11, 1953, p. 126-128.

Shows that Ti as a desulfurizer is three times more effective in preventing strain aging and grain coarsening in killed steels. 25 ref. (D general, B22, Ti, ST)

231-D. Steelmaking Reactions. Sulphur, Phosphorus and Carbon. P. T. Carter. *Iron & Steel*, v. 26, June 1953, p. 297-302.

Slag constitution, S removal, slag-metal reactions, effects of MgO, FeO, CaF_2, elements dissolved in iron, and temperature. 56 ref. (D general, ST)

232-D. Studies on the Melilite Solid Solutions. R. W. Nurse and H. G. Midgley. *Iron and Steel Institute, Journal*, v. 174, pt. 2, June 1953, p. 121-131.

Melilite is the major constituent of crystalline blast-furnace slag. Synthetic preparations; properties; binary and tertiary systems; and Na and K-bearing melilites. Diagrams, tables. (D1, B21)

233-D. Relining and Enlarging No. 9 Blast-Furnace at Appleby-Frodingham. G. D. Elliot, A. Bridge, E. Jarvis, and T. E. Mitchell. *Iron and Steel Institute, Journal*, v. 174, pt. 2, June 1953, p. 143-158.

Description of the job with details of methods, tools, gears, etc. Diagrams. (D1)

234-D. Production and Quality of A.I.S.I. C-1200 Series Screw Steels. S. Feigenbaum. *Screw Machine Engineering*, v. 14, June 1953, p. 57-58.

Production in openhearth furnaces. (D2, CN)

235-D. (French.) **Can the Incorporation of a Chemical Product Charged With Coke Modify the Working of a Blast Furnace and Reduce the Consumption of Coke?** M. Legendre. *Circulaire d'Informations Techniques*, v. 10, no. 4, 1953, p. 639-642.

Suggests the introduction of Na_2CO_3 as it would augment basicity of slag, lower its fusion point, and protect coke from CO_2. Tables, graphs. (D1)

236-D. (French.) **Heating of Open-Hearth Furnaces With Fuel Oil.** J. E. Lafon. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 205, 207, 209.

Types of fuel oil to use, kind of burner, and design of the furnace. Table, diagram. (To be continued.) (D2)

237-D. (German.) **Test Results on Blast Furnaces With Various Hearth Linings and Bottoms.** Bernhard Weilandt. *Stahl und Eisen*, v. 73, no. 11, May 21, 1953, p. 696-704.

Behavior and selection of materials; measures and controls in furnace heating; construction of furnace foundation; the salamander; and calculation of temperatures in the hearth. Photographs, graphs, tables, diagrams. 31 ref. (D1)

238-D. (German.) **New Working Processes in the Iron Industry and Their Effects on Construction of Metallurgical Plants.** G. Bulle. *Zeitschrift des Vereines deutscher Ingenieure (VDI)*, v. 95, nos. 14-15, May 15, 1953, p. 435-440.

Improvements in various furnaces to effect best possible working of ores and scrap. Effects and economies in steel production. Diagrams. 2 ref. (D general, A4, ST)

239-D. Low-Frequency Induction Melting Employed in Malleable Foundry. Curtis Pollock. *Foundry*, v. 81, July 1953, p. 108-111, 266-269.

How low-frequency induction furnaces provide minimum cost, uniform quality Fe for malleable foundry. Photographs. (D6, E10, CI)

240-D. Pittsburgh Steel Company Increases Production Capacity. *Iron and Steel Engineer*, v. 30, June 1953, p. 126, 129-130.

New equipment in the openhearth department. Photographs. (D2, ST)

241-D. Monolithic Linings in Furnace Spouts. Working Conditions Improved at Armco Steel Corp. V. W. Jones. **Monolithic Linings Successful at Crucible Steel Co.** G. M. Burrier. **Practice Adopted at Bethlehem Steel Co.** J. C. MacNeill. *Journal of Metals*, v. 5, July 1953, p. 877-880.

Experiences with monolithic refractory-lined spouts. Photographs. (D9)

242-D. Open Hearth Slag Removed Economically by Blasting. J. O. Dague. *Journal of Metals*, v. 5, July 1953, p. 881-883.

Procedures, advantages and disadvantages. Photographs. (D2)

243-D. Vancouver Steel Co., Ltd., Uses Mullite Roofs on Electric Furnaces. G. R. Heffernan. *Journal of Metals,* v. 5, July 1953, p. 884-885.

Physical properties and tests made on mullite roofs. (D5, B19)

244-D. Further Studies of the Tuyere Zone of the Blast Furnace. J. B. Wagstaff. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 895-902.

Raceway in front of the tuyere of the blast furnace was studied quantitatively and a correlation obtained for the penetration of the blast. Some evidence is presented for the height and width of the raceway which suggests that all the raceways of a furnace overlap. Size of the coke in this zone was measured photographically during normal operation and results given. Graphs, tables. (D1)

245-D. Hydraulic Arc Furnace Electrode Control. *Metallurgia,* v. 47, June 1953, p. 291, 294.

Principles of control and details of an Italian system. Photographs. (D5)

246-D. Chromium-Nickel Steels Alloyed With Nitrogen. *Metal Progress,* v. 63, June 1953, p. 170-172. (Translated and condensed by N. H. Polakowski from "The Problem of Making Nitrogen-Alloyed Chromium-Nickel Austenitic Steels", by V. I. Prosvirin, N. S. Kreshtshanovskiy, and R. P. Zaletayeva, *Liteynoe Proizvodstvo,* no. 9, 1952, p. 22-23.)

Investigation of maximum amount of N_2 that can be absorbed by the steel without impairing quality of the ingot or casting, ratio of N_2 in the charge to that retained in solid solution, and loss of N_2 in the liquid steel as a function of the melting procedure. (D general, AY)

247-D. Steam From Steel. Robert W. Worley and Harold J. Bentson. *Power Engineering,* v. 57, July 1953, p. 54-57.

Use of blast-furnace gas as fuel for steam and power generation. Diagrams, photographs. (D1, ST)

248-D. Blast Furnace Modernization Program Solves Air and Stream Pollution Headache. *Steel Equipment & Maintenance News,* v. 6, May 1953, p. 12-14.

Illustrates new facilities. (D1, ST)

249-D. Properties of Vacuum-Melted Steels Containing 25% Chromium. J. Hochmann. Henry Brutcher Translation 2981, 3 pages.

Previously abstracted from *Revue de Metallurgie.* See item 22-D, 1952. (D8, Q general, R2, SS)

250-D. Influence of Slag Control Upon Gas Flow in the Blast Furnace. W. Wolf. Henry Brutcher Translation 2994, 7 pages. (From *Stahl und Eisen,* v. 72, 1952, no. 13, p. 777-778.)

How poor burden conditions resulting in blast furnace incrustation can be remedied. Graphs. (D1, Fe)

251-D. Reduction of Magnetic Iron Oxides in Mixture With Nickelous and Cobaltous Oxides. V. I. Arkharov, A. K. Varskaya, M. G. Zhuravleva, and G. I. Chufarov. Henry Brutcher Translation 3027, 8 pages. (From *Doklady Akademii Nauk SSSR,* v. 87, 1952, no. 1, p. 49-52.)

Study of the reduction of magnetic FeO in a mixture with CoO and NiO. Graph, table. 4 ref. (D general, Fe)

252-D. (German.) Electrical Resistance and Voltage Measurements Between Molten Iron and Furnace Linings of Refractory Clay, Corundum, and Magnesite and Measurements on Formation of Thermal Chains in Such Oxides. Wilhelm Anton Fischer and Rudolf Schäfer. *Archiv für das Eisenhüttenwessen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 105-111.

Experiments carried out in high-frequency and Tamman furnaces. Emf values are explained by reduction of crucible material. Graphs, diagrams. 14 ref. (D6, Fe)

253-D. (German.) Melting Loss of Alloying Elements During Oxygen Refining in the Basic Electric-Arc Furnace. Eberhard Pachaly. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 461-469.

Alloying, especially of Ni, was facilitated by O_2 enrichment. W, V, Ni, Mo, Cu, and Co remain in the bath longer. Graphs, tables. 12 ref. (D5, Ni, W, V, Mo, Cu, Co)

254-D. The Manufacture of Silicon Capped Steel. Albert Lami. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 151-163.

Why capped steels are preferred to rimmed steels. Advantages. Photographs (D9, CN)

255-D. A Study of the Premature Cracking of Iron Ingot Molds. Richard E. Kerr. *American Iron and Steel Institute. Regional Technical Meetings,* 1953, p. 215-240.

Investigation into major cracking of the bottletop 30 × 48-in. mold. Graphs, photographs. 20 ref. (D9, CI)

256-D. Danger Zones in a Blast Furnace Lining. R. B. Snow and W. C. Allen. *American Iron and Steel Institute. Regional Technical Meetings,* 1953, p. 253-324.

Some of these zones, literature regarding them, and data obtained in recent investigations. Tables, photographs, micrographs diagrams. (D1)

257-D. Blast Furnace Charged With Belt Conveyors at the Societe John Cockerill Works in Seraing. L. Halbrecq. *Blast Furnace and Steel Plant,* v. 41, July 1953, p. 743-750.

Expansion of the plant and installation of new systems. Photographs, diagrams. (D1)

258-D. Permeability of Blast Furnace Burdens. Paul B. Stubbs and Robert L. Stephenson. *Blast Furnace and Steel Plant,* v. 41, July 1953, p. 772-775.

Equipment used, effect of air velocity, evaluation of coke, and beneficiated burden materials sizes. Diagrams, graphs. (D1)

259-D. Steel. Austrians High on Oxygen. *Iron Age,* v. 172, July 23, 1953, p. 63.

Modified bessemer method to make oxygen steel. (D3)

260-D. Steelmaking Reactions. II. Sulphur, Phosphorus and Carbon. P. T. Carter. *Iron & Steel,* v. 26, July 1953, p. 339-346.

A review of slag-metal reactions, compares laboratory and works data. 49 ref. (D general, P12)

261-D. Reduction of Iron Oxides With Lignite. C. V. S. Ratnam. *Journal of Scientific & Industrial Research,* v. 12B, May 1953, p. 209-211.

Reduction of ferric oxide to metallic iron using four forms of lignite and a coconut-shell charcoal. Influence of reducing agent, its ratio (ratio of the amount used to that required theoretically) and temperature of reduction. (D8, Fe)

262-D. (French.) Improving the Bottoms of Basic Bessemer Converters. The Use of Dolomite and Tarred Dolomite. G. Naeser. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 10, no. 5, 1953, p. 755-764.

Baking temperature, grain surface activation, and mixing temperature of tar and dolomite. Effect of baking on bricks and bottoms. Experimental arrangement. (D3)

263-D. (French.) Conversion of Open-Hearth Furnaces to Mazut Firing. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 10, no. 5, 1953 p. 805-814.

Results obtained in various French plants. Experimental conditions and advantages of the use of heavy oil derivatives. (D2)

264-D. (French.) A New Electrothermic Process for Producing Pig Iron. G. Zuliani. *Journal du four Electrique,* v. 62, no. 1, Jan.-Feb. 1953, p. 25-27.

Lubatti electric furnace which simplifies the method. Diagram. (D8, CI)

265-D. (Italian.) Chemical-Physical Aspects of the Deoxidation of Steel. Felice De Carli. *Metallurgia Italiana,* v. 45, no. 3, Mar. 1953, p. 100-109.

Graphs, tables. 19 ref. (D general, P12, ST)

266-D. (Russian.) Method of Calculating Symmetrical Operating Conditions of Arc Furnaces. R. I. Karaev. *Elektrichestvo,* no. 10, Oct. 1952, p. 38-44.

Method of calculating circuits with the consideration of nonlinearity. Formulas for computing current and power of 1 and 3-phase furnaces. Graphs, formulas. 4 ref. (D5)

267-D. Rolling of Thin Sheet From Molten Cupola Iron. V. Gudrych. Henry Brutcher Translation 2991, 3 pages. (From *Svet Prace* (Prague), Jan. 10, 1952).

Compares cast iron sheet with steel sheet for cost and resistance to corrosion. Possibilities of paint coating, hot galvanizing, and fire enameling of cast iron sheet. (D9, R general, L16, L26, CI, CN)

268-D. Casting Ingot Moulds. J. E. Rehder. *Canadian Metals,* July 1953, p. 30-31.

General arrangement of apparatus. sand preparation, melting and pouring. Photographs. (D9, CI)

269-D. Rehabilitating a Blast Furnace and Associated Equipment. W. C. Daniels. *Iron and Steel Engineer,* v. 30, July 1953, p. 57-65; disc., p. 65-66.

Case history of rebuilding a blast furnace unit. Photographs. (D1)

270-D. Simplified Construction of Heat Balances for the Blast-Furnace Process. S. Klemantaski. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 236-241.

Data for constructing heat balances by stages for any combination of subprocesses. Tables, graphs. (D1, CI)

271-D. Design Features of Fairless Works Open Hearth. H. A. Parker. *Journal of Metals,* v. 5, Aug. 1953, p. 976-978.

Layout of furnaces and equipment. Photograph, diagrams. (D2)

272-D. Deoxidation and Degasification Practice for Basic Electric Furnace Alloy Steels. A. L. Ascik. *Journal of Metals,* v. 5, Aug. 1953, p. 986-990.

Importance of deoxidation and degasification in producing alloy steels. (D5, Cr, Ag, Mn, Al, AY)

273-D. Reducing Period in Stainless Steel Melting. H. P. Rassbach

and E. R. Saunders. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1009-1016.

Stainless steel melting practices for higher efficiency. Graphs, tables. 8 ref. (D5, SS)

274-D. (French.) **Observations on the Advisability of a Second Calcium-Soidum Slagging in the Converter.** Delong and Demarteau. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* no. 6, 1953, p. 961-970.

Efficiency of above in refining steel. Tables, graphs. (D3, CN)

275-D. (French.) **Study of the Elimination of Silicon From Pig Iron by Pre-Blowing.** M. Tavard. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* no. 6, 1953, p. 971-983.

Concludes that preblowing used to lower the Si content of Thomas-Gilchrist pigs must be done in a basic converter to avoid excessive loss of Fe and Mn. Tables, graphs. (D3, CN)

276-D. (German.) **Influence of Partial Pressure of the Air Blast on Nitrogen Pick-Up.** Theo Kootz. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 203-206.

Varying amounts of N_2 in air blast processes and amounts of N_2 absorbed by steel. (D3, ST)

277-D. (German.) **Behavior of Hydrogen in Production of Steel.** Erich Piper, Heinz Hagedorn, and Horst Backes. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 817-828.

Reports on improved sampling and analysis whereby H_2 contents are determinable from crude iron to completed steel ingot. H_2 content rose after tapping in most cases. Behavior of H_2 in stored ingots. Diagrams, graphs, tables. 44 ref. (D general, S11, ST)

278-D. (German.) **Industrial Experiments With the Blast Furnace, Especially With Regard to the Question of Nitrogen in Bessemer Crude Iron and in Steel.** Werner Geller. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 851-853.

Effects of slag composition, blast temperature and atmospheric conditions on N_2 content. (D2, CI, CN)

279-D. (Russian.) **Complex Use of Blast-Furnace Slag.** P. Budnikov. *Za Ekonomiiu Materialov,* no. 4, Nov. 1952, p. 59-65.

Method for obtaining clinkerless cement. Tables. (D1)

280-D. Metal Casting Methods. IV. Ferrous Ingots. J. B. McIntyre. *Metallurgia,* v. 48, no. 285, July 1953, p. 21-26.

Casting of pig iron. Problems involved in ingot production and their solution. Diagrams, photographs. 12 ref. (D9, CI, CN)

281-D. (French.) **Heating of Openhearth Furnaces With Fuel Oil.** J. E. Lafon. *Métallurgie et la Construction Mécanique,* v. 85, no. 3, Mar. 1953, p. 205, 207, 209; no. 4, Apr. 1953, p. 295, 297, 299.

Part I: Types of fuel oil and design of burners and furnace. Part II: Thermal advantages of using fuel oil and summary of results obtained in England and France. Tables, diagram. (D2)

282-D. (French.) **The Charging of Blast Furnaces With Powdered Raw Materials.** Paul Thierry. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 345, 347, 349, 351.

Origin of various powder materials and the methods used in charging the furnaces with them. Wetting, direct injection into the bottom of the furnace and pressing of briquetts. Graphs. (D1, Fe)

283-D. (French.) **Increasing the Productivity of Open-Hearth Furnaces.** J. E. Lafon. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 393, 395, 397.

Problem of the time element in effecting fuel savings. Repair, charging, smelting, refining and tapping are analyzed. Diagrams. (D2)

284-D. (French.) **The Use of Methane in the Italian Iron and Steel Industry.** A. Scortecci. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 253-262; disc., p. 262-263.

Principal sources and uses. Application to the openhearth furnace fired with a mixture of naphtha and CH_4. Diagrams, graphs, tables, photographs. 18 ref. (D2)

285-D. (French.) **A Note on the Making of Small Billets of Semikilled Steel, Produced With a Single Slag in a Basic Electric Arc Furnace.** Max Petitdidier. *Revue de Metallurgie,* v. 50, no. 3, Mar. 1953, p. 177-186; disc., p. 186-188.

Making of billet ingots and blooms for immediate utilization in rolling mills. Graphs, diagrams. 5 ref. (D5, CN)

286-D. (French.) **The Volume Flow-Recording Apparatus Adapted to the Basic Bessemer Process of Using Oxygen Enrichment.** R. Michaux and P. Leroy. *Revue de Métallurgie,* v. 50, no. 3, Mar. 1953, p. 215-228.

Apparatus designed to record the flow of air blown into a converter. Diagrams, graphs, photographs. 5 ref. (D3, S)

287-D. (Hungarian.) **Dry Granulation of Blast-Furnace Slags.** Robert For-

bath. *Kohaszati Lapok,* v. 7, no. 6, June 1952, p. 121-127.

Preparation of blast furnace slag for use in portland cement. Diagrams, graphs. (D1, A8)

288-D. Design and Construction of a Carbon Lined Blast Furnace. J. M. Stapleton and W. S. Debenham. *American Iron and Steel Institute,* New York, May 1953, 13 p.; *Industrial Heating,* v. 20, Aug. 1953, p. 1582, 1584, 1586, 1588.

Possibility of increased production through thinner refractory linings and increased furnace size was investigated. Tables, graphs. (D1)

289-D. (Swedish.) **Large Silicate Inclusions in Acid Open-Hearth Ball Bearing Steel During Different Stages of the Heat.** S. Baeckström. *Jernkontorets Annaler,* v. 137, no. 4, 1953, p. 117-127.

Study of steel quality at different stages of manufacture. Tables, diagrams. (D2, CN)

290-D. (Book—German.) **(The Basic Converter Method.) Das basische Windfrishverfahren.** Karl Eichel. 378 p. 1952. Verlag Technik, Berlin, Germany.

Reviews all aspects of steelmaking by basic converter methods. (D3)

291-D. Steelmaking Reactions. III. Reactions of Phosphorus. P. T. Carter. *Iron and Steel,* v. 26, Aug. 1953, p. 387-392.

Slag-metal reactions. 44 ref. (D general, Fe)

292-D. Experiences With Oxygen Control in Open Hearth Flue Gases. F. P. Hubbell. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 53-56; disc., p. 57-58.

Analyzing instruments. Diagrams. (D2, S11)

293-D. Ferromanganese Cleaning Plant Starts up on Duquesne Furnace. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 136, 139.

Equipment for removing dust from gas and processing the dust after removal. (D1, A5)

294-D. Some Factors Affecting Open-Hearth Steelplant Performance. J. S. Curphey. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 305-316.

Hot metal practices, slagging, furnace design, refractory wear and human factors. Graphs, tables, diagrams. (D2, ST)

295-D. Studies in the Deoxidation of Iron. Deoxidation by Titanium. E. Ll. Evans and H. A. Sloman. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 318-324.

Preparation, analysis and microscopical examination of a series of ingots made by adding O_2 and Ti in various amounts to 400-g. melts of pure Fe. Tables, micrographs. 11 ref. (D9, Fe)

296-D. Permeability Tests on Blast-Furnace Raw Materials. E. W. Nixon and F. R. Maw. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 331-334.

Apparatus used to study permeability of burden materials. Possibilities of its use for practical and fundamental research. Diagrams, graphs. (D1)

297-D. Repair and Maintenance of Open-Hearth Furnaces in Germany. A. Mund and C. Kreutzer. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 373-377.

Condensed from paper presented at Twenty-First Meeting of the ISE Group, Jan. 21, 1953, London. Methods for highest efficiency and durability. Graphs. (D2)

298-D. Open Hearth Challenged as More Carbon Steel Goes Electric. Allen G. Gray. *Steel,* v. 133, Aug. 24, 1953, p. 84, 86-88, 108.

Article based on Battelle report to Bituminous Coal Research Inc. Economics of the processes. Table, photographs. (D2, D5, CN)

299-D. Side-Blow Converter Refractories. Ralph A. Clark. *American Foundryman,* v. 24, Oct. 1953, p. 34-39.

Types, application methods, service conditions and repair of refractory linings. Photographs, diagrams, table. (D3, ST)

300-D. Determination of Arc Furnace Optimum Current. D. R. Cochran. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1031-1036.

Method for determining optimum current. Method in connection with efficient furnace operation. Tables, graphs, diagram. (D5)

301-D. Open Hearth Furnace Design and Availability. G. Reginald Bashforth. *British Steelmaker,* v. 19, Sept. 1953, p. 541-549.

Progress in steelmaking during past 30 years in respect to furnace design. Diagrams. 15 ref. (D2)

302-D. Arc Furnace Electrode Control. *British Steelmaker,* v. 19, Sept. 1953, p. 556-557.

Hydraulic electrode control and advantages. Photographs. (D5)

303-D. Production of Spheroidal-Graphite Cast Iron in a High-Frequency Furnace. B. Jones and R. Jelley. *Foundry Trade Journal,* v. 95, Sept. 10, 1953, p. 313-319.

Exploratory melts in an acid-lined electric furnace, citing advantages of electric method. Micrographs. (D6, CI)

304-D. The Manufacture of Silicon Capped Steel. Albert Lami. *Industrial Heating,* v. 20, Sept. 1953, p. 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1849.

A practice of effectively capping regular molds by the use of ferro-silicon. Table, photographs. (D9, CN)

305-D. Steel Mill Refractories and Masonry. *Industrial Heating,* v. 20, Sept. 1953, p. 1803-1804, 1806.

Furnace uptake design and port-end construction. (To be continued.) (D general)

306-D. Open-Hearth Instrumentation. R. A. Lambert. *Instruments,* v. 26, Sept. 1953, p. 1370-1371, 1397-1402, 1404, 1406.

Data on the instrumentation for control of reversal, roof temperature, combustion air, fuel-air ratio and furnace pressure. Photographs, diagrams. (D2, S16, S18)

307-D. "Oxygen Steelmaking" Yields High-Quality Product. H. Malzacher and R. Walzel. *Iron Age,* v. 172, Sept. 24, 1953, p. 127-130.

New converter technique producing low N_2 steel comparable with openhearth steel. Diagrams, graphs, tables. (D3, CN)

308-D. Steelmaking Reactions. IV. Oxidation and Removal of Carbon. P. T. Carter. *Iron & Steel,* v. 26, Sept. 1953, p. 427-433.

C-O equilibrium in liquid Fe, mechanism of C-O reaction, factors affecting rate of C removal, use of O_2 and foaming. 82 ref. (D general, P12, ST)

309-D. Oxygen Activity in Iron Oxide Slags. Hugo Larson and John Chipman. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1089-1096.

Ferrous and ferric oxide concentrations of slags were established through gas-slag equilibrium at 1550° C. in a range of O_2 pressure at 10^{-1} to 10^{-9} atm. Oxygen pressure is shown graphically as a function of composition for slags which are analogous to those at the slag-gas interface of the openhearth furnace. Diagram, graphs. 16 ref. (D2, B21, P12, ST)

310-D. Induction Melting Furnaces. R. Lethen. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 421-424.

Design and construction of furnace for melting iron and steel using line frequency. Photographs, dia-

311-D. Selection of Carbon Steel Bars. II. G. P. Witteman. *Steel,* v. 133, Sept. 21, 1953, p. 131-132, 135.

Amount of O_2 in steel prior to or during casting, to determine whether it is killed or nonkilled. Types are semikilled, rimmed, killed and capped. Photographs, tables. (D9, CN)

312-D. How to Curb Heat Losses From Cooling Units. A. M. Frankau. *Steel,* v. 133, Sept. 21, 1953, p. 138, 140.

Methods to prevent large heat losses in openhearth furnace chills and door frames. Tables. (D2)

313-D. (English.) **Pig-Iron Production in Blast Furnaces Using Charcoal.** Louis Ensch. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.31, 1952, 11 p. Published jointly by ECLA-TAA for United Nations.

Furnace operation relative to the development of an iron and steel industry in South America. Tables. 7 ref. (D1, CI)

314-D. (English.) **Operation of the Charcoal Blast Furnace at Corral Using Mixtures of Metallurgical Coke and Charcoal.** Danilo Vucetich. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.32, 1952, 9 p. Published jointly by ECLA-TAA for United Nations.

Brief history of the development and improvement of the blast furnace. Diagrams, graphs, tables. (D1)

315-D. (English.) **Notes on Production of Pig Iron.** G. Bulle. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.36, 1952, 4 p. Published jointly by ECLA-TAA for United Nations.

Use of coke blast furnaces in the production of pig iron. (D1, CI)

316-D. (English.) **Progress in the Manufacture of Pig Iron and Ferro-Alloys With the Low Shaft Electric Furnace.** Herman Walde. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.37, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Advantages of electric furnace where hydro-electric power is available. Tables, graphs. 4 ref. (D8, Fe)

317-D. (English.) **Making of Steel in Electric Furnaces.** H. S. Newhall. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.38, 1952, 10 p. Published jointly by ECLA-TAA for United Nations.

Advantages of electric furnace over blast furnace. Cost of operation, initial cost and practical size. (D8, ST)

318-D. (English.) **The Krupp Renn Process.** Friedrich Johannsen. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.39, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Krupp Renn process as it exists today and its advantages. Diagrams, tables, photographs. (D8, Fe)

319-D. (English.) **The Basset Process for the Production of Pig Iron in Rotary Kilns.** Knud E. Jensen. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.42, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Advantages and disadvantages. Tables. (D8, Fe)

320-D. (English.) **Production of Sponge Iron in a Rotary Kiln at Temperatures Below the Fusion Point of the Material.** Russell C. Buehl. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.44, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Commercial production of sponge iron. Diagrams, tables. 25 ref. (D8, Fe)

321-D. (English.) **Considerations on the Development of the Production of Iron.** R. Durrer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.45, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

General discussion on the problem of iron production. (D general, Fe)

322-D. (English.) **The Rotary Kiln Processes for Sponge Iron.** Bo Kalling. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.46, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

Advantages of the Domnarfvet method of producing Fe. Diagrams, tables. (D8, Fe)

323-D. (English.) **Production of Sponge Iron According to the Wiberg-Söderfors Method.** John Stalhed. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.47, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Theory of the Wiberg process. Graphs, tables, diagrams. (D8, Fe)

324-D. (English.) **The Electric Pig Iron Furnace. Possibilities and Limitations for Its Use in the Iron and Steel Industry.** Alfonso Ballon. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.48, 1952, 17 p. Published jointly by ECLA-TAA for United Nations.

Brief description and data as a guide to the application of low-shaft electric furnace. Tables. 4 ref. (D8, CI)

325-D. (English.) **Electric Smelting of Pig Iron.** M. O. Sem. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.49, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Operation of the electric furnace. Tables. (D8, CI)

326-D. (English.) **Use of Phosphorus Ores for the Production of Pig Iron for Transforming Into Steel by the Thomas Process (Basic Bessemer).** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.54, 1952, 4 p. Published jointly by ECLA-TAA for United Nations.

Thomas process of steel conversion. Tables. (D3, ST)

327-D. (English.) **Steel Production in Latin America.** G. Bulle. Bogota Conference, Oct. 13-Nov. 5, 1952, ST/ECLA/CONF. no. 1/L.55, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Processes, layouts, raw materials and planning. Tables, diagrams. (D general, A4)

328-D. (English.) **Considerations Concerning the Choice of Electrical Equipment for the Iron and Steel Plants of Paz De Rio (Columbia) and Chimbote (Peru).** R. L. Jung. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.57, 1952, 15 p. Published jointly by ECLA-TAA for United Nations.

Use of electric energy as motive power for steelmaking. (D5, D6)

329-D. (English.) **Description of the Duplex Procedure Used for Manufacturing Steel in Monterrey.** Alfredo Gonzalez Ballesteros and Narciso Morales. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.59, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Fundamental equipment and operation of the duplex method. (D7)

330-D. (English.) **Construction of a Steel Plant Intended to Cover a Part of the Requirements of a Non Steel-Producing Country.** Andre Mercier. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.61, 1952, 6 p. Published jointly by ECLA-TAA for United Nations.

Brief description of a steel plant using two blast furnaces. Tables, diagram. (D1, ST)

331-D. (English.) **Approximate Comparative Production Costs and Investment Requirements of the Standard Blast Furnace, Electric Smelting Furnace, Sponge Iron Furnace, and Tun-**

nel Kiln Sponge Iron Furnace. P. E. Cavanagh. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.62, 1952, 1 p. Published jointly by ECLA-TAA for United Nations.

A table comparing plant and furnace capacity, production costs and investment. (D general, A4, Fe)

332-D. (English.) **Economics of the Modern Acid Open Hearth Practice.** G. R. Fitterer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.64, 1952, 28 p. Published jointly by ECLA-TAA for United Nations.

Recent advances in technology which have added to the advantages of this process. Graphs, photograph, table. (D2, A4, ST)

333-D. (English.) **The Acid Bessemer Process.** W. O. Philbrook. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.65, 1952, 28 p. Published jointly by ECLA-TAA for United Nations.

Comprehensive account of Bessemer steel, the raw materials used and economics of the process. Tables. 26 ref. (D3, A4, ST)

334-D. (English.) **Acid Open Hearth Products and Their Specifications.** G. R. Fitterer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.72, 1952, 29 p. Published jointly by ECLA-TAA for United Nations.

Advantages of process with respect to economics and steel quality. Tables, photographs. (D2, S22, A4, ST)

335-D. (English.) **Thomas Steel With Low Nitrogen and Low Phosphorus Content.** P. Coheur. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.73, 1952, 11 p. Published jointly by ECLA-TAA for United Nations.

Research undertaken to reduce N and P content of steel. Tables, graphs. (D2, ST)

336-D. (English.) **Brief Account of Iron and Steel Producing Processes Used in Brazil.** Amaro Lanari, Jr. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.74, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Characteristics of raw materials, metallurgical methods and processes used and possible evolution of these processes. Tables. (D general, B10, Fe, ST)

337-D. (English.) **Control in Steel Production. I. The Control of Composition During Steelmaking.** G. Weston and G. R. Bolsover. **II. Standardization in Relation to Control in Steel Production.** G. Weston and R. L. Richards. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.76, 1952, 27 p. Published jointly by ECLA-TAA for United Nations.

Table. (D general, ST)

338-D. (English.) **Basic Open-Hearth Steelmaking Practice in the United States of America.** William C. Buell, Jr. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.77, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.

Processing of steel in the open-hearth furnace. Tables. (D2, ST)

339-D. (English.) **Processes for the Production of Steel.** Marc Allard. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.79, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Precautions concerning blowing in the basic converter process and rapid refining of steel through the Perrin process. Tables, graphs. 8 ref. (D3, D5, ST)

340-D. (English, Spanish.) **The Acid Bessemer Process in Huachipato (Chile.)** Hector Canguilhem. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.60, 1952, 25 p. Published jointly by ECLA-TAA for United Nations.

Main characteristics of the steel production department of the Bessemer convertor. Tables, graphs, diagrams. 12 ref. (D3, ST)

341-D. (English, Spanish.) **Foundry Iron by Recarburization of Steel Scrap.** Roberto Jaramillo, Joaquin Prieto, and Jaime Rudas. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.82, 1952, 21 p. Published jointly by ECLA-TAA for United Nations.

Recarburizing practice and additional operating details. Tables. 7 ref. (D8, Fe)

342-D. (Czechoslovakian.) **Saving of Molybdenum in Special Steels.** Rudolf Stefec. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 395-398.

Possibilities of replacing Mo in high speed, tool, structural and stainless steels. (D general, B22, Mo, SS, TS, AY)

343-D. (Czechoslovakian.) **Preparation of Open Hearth Slag Prior to Complete Melting of Charge.** Ivo Petrman. *Hutnické Listy,* v. 7, no. 11, Nov. 1952, p. 566-575.

Procedures for improving refining and degassing reactions. Tables, graphs. 3 ref. (D2, ST)

344-D. (French.) **Other Methods for the Use of Blast Furnace for Reduction of Minerals. The Low Shaft Blast Furnace.** Marc Allard. Interna-

tional Committee for Research on the Low Shaft Blast Furnace. 1953, 20 p.
Proposed low-shaft blast furnace and the research program of the committee. Tables. (D1, A9)

345-D. (French.) **Manufacture of Cast Steel in Electric Furnace and Tests Made in Spain. Tests in the P. Echevarria Plant.** *Journal du Four Electrique,* v. 62, no. 3, May-June 1953, p. 87-88.
Production of electric steel. Electrodes and raw materials used. (Concluded.) (D5, CI)

346-D. (French.) **Decarburization by Means of Oxygen of a Phosphorous Melt in the Open-Hearth Furnace.** G. Husson and P. Bettembourg. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 357-371.
Details of method and results obtained. Metallurgical process. Economic consideration, hourly production rate and the problem of dust in the fumes. 15 ref. (D2, A5, ST)

347-D. (German.) **Blast-Furnace Gas Purification at United Austrian Iron and Steel Works in Linz.** Alois Uxa. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 975-980.
Purification process. Graphs, diagrams, tables, photograph. 5 ref. (D1)

348-D. (German.) **Plant Experience and Economic Considerations in Blast-Furnace Operation With Increased Furnace Load.** Heinrich Kahlhöfer and Rudolf Ehrhardt. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1014-1026.
Effect of furnace load on production of blast furnaces. Change in coke consumption, dust production, temperature of waste gases, and temperature and composition of the crude iron. Tables, graphs. 13 ref. (D1, Fe)

349-D. (German.) **Cooling Open-Hearth Furnaces.** Albert Harnisch. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1026-1028.
Water-cooling installation for a 60-ton openhearth furnace. Diagrams. (D2)

350-D. (German.) **Savings in Water Effected by Cooling Installations on Open-Hearth Furnaces.** Hans Lardy. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1028-1030.
Combined cooling and steam generating installation. Economic advantages. Diagram, photographs. (D2)

351-D. (German.) **High-Pressure Steam Produced by the Heat of Waste Gases and Cooling Water of Open-Hearth Furnaces.** Kurt E. Poppe. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1030-1035.
Production of steam in waste-heat boilers and door-cooling frames and use of the steam in turbines. Tables, diagrams. (D2)

352-D. (German.) **Materials Balance and Comparison of Economic Efficiency of Various Steel-Making Processes.** Ernst Krebs and Robert Görgen. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1081-1094.
Materials balance and production costs in openhearth, bessemer and electric furnace processes. Costs compared for the three processes. Tables, graphs, diagram. 15 ref. (D2, D3, D5, A4, ST)

353-D. (German.) **Test for Determining Reducibility of Iron Ores.** Ciril Rekar. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1094-1101.
Reduction tests were made on three Yugoslav iron ores. Charcoal, CO and coke were used as reducing agents. Reduction-temperature curves plotted and compared. Photographs, graphs, diagrams, tables. 9 ref. (D general, B22, Fe)

354-D. (Hungarian.) **The Problem of Refractory Materials, With Special Respect to the Increased Application of Mazut Firing in Open-Hearth Furnaces.** Béla Selmecizi. *Kohaszati Lapok,* v. 8, no. 2, Feb. 1953, p. 25-33.
Advantages and construction details of complete basic linings. Soviet experience in the field. Graphs, table. (D2, B19)

355-D. (Italian.) **Comparison of Some Characteristics of Steels Decarburised With Oxygen and With Rolling Mill Scale.** Luciano Piana. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 212-217.
No difference in quality was observed. Tables. (D general, CN)

356-D. (Italian.) **Possibility of Extending Sanfter's Empirical Expression for the Blast Furnace to Other Ferrous Mineral Reduction Processes. Possibility of Calculating the Specific Consumption When the Furnace Charge Elements are Known.** Agostino Bargone. *Tecnica Italiana,* v. 8, no. 3, Apr.-May 1953, p. 161-164.
Table. 11 ref. (D general, Fe)

357-D. (Spanish.) **Problem of Power in Iron and Steel Works.** Gabriel Périn. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.58, 1952, 17 p. Published jointly by ECLA-TAA for United Nations.
Discussed solely in the realm of ideas. Shows how, in the majority of cases, steel works are being induced to supplement their mills with power plants. Table. (D general)

358-D. (Spanish.) **Some Data for the Construction of a Basic Bessemer Steel Plant (Paz de Rio). Approximate Cost of Producing One Ton of Bessemer Steel.** Edouard Decherf. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.63, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

Construction of Thomas steel plant. Compares production costs of steel. Tables, diagrams. (D3, A4, ST)

359-D. (Spanish.) **Possibilities of Applying Ultrasounds to the Iron and Steel Industry.** K. Bruckman. Bogota Conference, Oct. 13-Nov. 5, 1952. STT/ECLA/CONF. no. 1/L.90, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Possibility of applying ultrasonics in the converter process. Tables. (D3, ST)

360-D. (Book—German.) **(Calculation of the Blast Furnace Burden.) Berechnung des Hochofenmöllers.** M. A. Pawlow. 148 p. 1952. Verlag Stahleisen m.b.H., Schliessfach 2590, Düsseldorf, Germany. 19 DM.

Problems of blast furnace economy. Methods for determination of the ratio of the ores, flux additions, and ash content of the fuel. (D1)

361-D. (Book—German.) **(Metallurgy of Pig Iron.) Metallurgie des Roheisens.** v. I. **Introduction and Charge Materials.** 194 p., v. II. **Blast Furnace Process.** 657 p., v. III. **Construction and Calculation of Blast Furnaces.** 296 p., v. IV. **Atlas Blast Furnace Constructions.** M. Pawlow. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 55 DM.

Discusses raw materials for blast furnace operation from the viewpoint of the metallurgist and the blast furnace operator. Also discusses the Mn, Cr, Ni, W, V, and Ti ores. (D1, Fe)

362-D. (Book—German.) **(The Oxygen Metallurgy of the Blast Furnace Processes.) Die Sauerstoffmetallurgie der Schachtofenprozesse.** Heinrich Koppenberg and Werner Wenzel. 237 p. 1953. Verlag Stahleisen m.b.H., Schliessfach 2590, Düsseldorf, Germany. 18 DM.

Development of metallurgical engineering. Pyrometric principles of O_2 utilization, theoretical and practical discussion of O_2 utilization in blast furnace processes. (D1, B22, Fe)

363-D. (French.) **Preparation of Blast Furnace Burden Using Lorraine Minettes.** Paul Thierry. *Métallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 603, 605.

Greenwalt, G.H.H. and Dwight-Lloyd processes. (To be continued.) (D1)

364-D. New Skinningrove Blast-Furnace. H. G. W. Debenham and W. H. Tubbs. *Iron & Steel,* v. 26, Oct. 1953, p. 460-467.

Equipment, plant layout and operating procedures. Diagrams, photographs. (To be concluded.) (D1, CI)

365-D. Some Factors Affecting Productivity in a Cold-Metal Open-Hearth Shop. W. S. Walker. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 17-23.

Effect on productivity of the five constituent parts of the production cycle and factors that influence them. Results of tests. Graphs, diagrams, photographs. 3 ref. (D2, S18)

366-D. Blast-Furnace Practice at Redcar Works. A. T. Ledgard. *Iron and Steel Institute, Special Report no.* 48, Jan. 1953, p. 24-36.

Operation of two blast furnaces of identical design. (D1)

367-D. Some Recent Developments in Steel Production and Products. William A. Dennis. *Journal of Chemical Education,* v. 30, Oct. 1953, p. 491-495.

As applied to iron ore; blast, open-hearth and bessemer furnaces; turmohearth process; rolling and hot-extrusion; and products. Photographs. 8 ref. (D general, ST)

368-D. American Arc Furnace Practice. W. B. Wallis. *Mining Journal,* v. 241, Oct. 9, 1953, p. 416-417.

Developments in construction and operation in steelmaking. (D5, ST)

369-D. Status Report on Continuous Casting. W. B. Pierce. *Steel,* v. 133, Oct. 12, 1953, p. 256-258, 260, 262, 265-266, 268-269, 271-272.

Process and equipment at one plant. Diagrams, photographs. (D9)

370-D. (French.) **Systematic Study by Means of Yield Charts of the Factors Determining the "Blowability" of Charges in the Basic Bessemer Converter.** P. Leroy, M. Gombert and B. Trentini. *Revue de Métallurgie,* v. 50, no. 9, Sept. 1953, p. 642-664.

Effect of the total area of blowing orifices determined during a progressive decrease in the number of orifices. Comparisons based on quality of the heat and permeability of the charge. Tables. (D3)

371-D. (French.) **Killed Basic Bessemer Steels.** Marc Allard. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 563-568; disc., 568-570.

Possibilities of obtaining steels by

the Bessemer process which are superior to ordinary openhearth steels. Table. (D3, ST)

372-D. (German.) **The Low Shaft Furnace Industry.** Heinz Schumacher. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 493-504; disc., 504-511.

Advantages of using increased amounts of O_2 in steelmaking. Tables, graphs, diagrams. (D1, ST)

373-D. (German.) **Hydrodynamic Study of Liquid Movements in the Basic Bessemer Converter.** P. Leroy. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 512-539; disc., 539-546.

Geometrical and physico-chemical factors influencing action of blast on melt. Diagrams, graphs. 13 ref. (D3)

374-D. (German.) **Report on the Production of Improved Converter Steel in the Low-Shaft Converter.** K. E. Mayer and H. Knuppel. *Revue universelle des mines,* v. 9, ser. 9, no. 8, Aug. 1953, p. 571-597.

Influence of nitrogen, oxygen, phosphorus and carbon on ductility and tendency to brittleness of steel. Graphs, tables, diagram. 47 ref. (D3, ST)

375-D. (German.) **Contribution to the Improvement of the Life of Basic Converters and Bottoms.** David Bird. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1337-1338.

Improvement of converter life and quality of steel is obtained by use of "3-4-1" dolomite lining. Tables, diagrams. 5 ref. (D3, ST)

376-D. (German.) **Investigation of the Tar for Converter Floors.** Raimond Calaque. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1339.

Life of converter is greatly influenced by tar as a binder. Table. (D3)

377-D. (Hungarian.) **Decreasing the Coke Needs in Pig Iron Production.** Laszlo Visnyovszky. *Kohaszati Lapok,* v. 8, no. 5, May 1953, p. 97-107; no. 6, June 1953, p. 121-126.

Proposes various methods on basis of Hungarian industrial experience. Additions of quicklime and dolomite. Protection against heat losses and control of amount of slag. Tables, graphs. 11 ref. (D1, Fe)

378-D. **Here's How the J & L Steel Corp. Makes Its Blast-Furnace Gas Yield Rich Iron Ore.** W. A. Walton. *Power,* v. 97, Nov. 1953, p. 95-97, 218, 220.

Equipment, plant layout and operating procedures. Photographs. (D1, Fe)

379-D. (Dutch.) **Gas in Pig and Cast Iron.** J. E. Degraaf. *Metalen,* v. 8, no. 17, Sept. 1953, p. 319-324.

Compares solubility of hydrogen, nitrogen and oxygen with gas content actually found. Supersaturation was proven to be frequent. Tables, graphs. 20 ref. (D1, E25, CI)

380-D. (French.) **Improving Basic Bessemer Steel. Utilization of Oxygen.** M. Allard. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* 1953, no. 10, p. 1585-1589.

Possibilities and problems of changes effected in the charge, desulfurization, normalizing the nitrogen content and decreasing phosphorus content. (D3, ST)

381-D. (French.) **The Conditions for a Favorable Distribution of Materials in the Blast Furnace.** Jean Vibrac. *Métallurgie et la construction mécanique,* v. 85, no. 9, Sept. 1953, p. 685-693.

Importance of correct distribution of charge and factors determining it. Calculations. Diagrams, graphs, table. (To be continued.) (D1)

382-D. (German.) **Bath Currents in the Converter and Nitrogen Content of Steel.** Karl Dacves. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1280-1282.

Effects of converter design and low bath levels on reduced nitrogen content. Graphs, diagrams, photographs. 6 ref. (D3, ST)

383-D. (German.) **The Movement of Steel in the Converter.** Fritz Schultz-Grunow. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1282-1284.

Experiments conducted in a "Plexiglas" model. Photographs, diagrams. (D3, ST)

SECTION E

FOUNDRY

1-E. Hot Strength at Falling Temperatures: Does it Influence Hot Tear Formation? D. C. Williams. *American Foundryman,* v. 22, Nov. 1952, p. 47-50.

Hot strength of sand as it cools from pouring temperatures and a procedure for obtaining additional similar data. How strength development in the mold during increasing and decreasing temperatures may contribute to hot tears. Graphs. (E18)

2-E. Segregation During Casting Shown by Radioactive Antimony. P. J. Killaby, B. J. Taylor, and W. C. Winegard. *American Foundryman,* v. 22, Nov. 1952, p. 59-62.

Comparatively new technique of autoradiography quickly and easily demonstrates that gravity segregation in cast metals, including Pb-Sb alloys, is minimized or eliminated by a fast cooling rate. Recommends use of radioactive tracers for studying this and other foundry problems. (E25, S19, Pb, Sb)

3-E. Casting in Cement Bonded Sand. J. B. McIntyre. *Foundry,* v. 80, Dec. 1952, p. 90-91, 269.

Use of silica sand bonded with portland cement for molding Mn bronze and Al bronze marine propellers and water-turbine runners. Advantages. (E18, Mn, Al, Cu)

4-E. Shell Molding at International Harvester Co. Garnet P. Phillips. *Foundry,* v. 80, Nov. 1952, p. 102-107, 282-292; Dec. 1952, p. 96-101, 177, 182.

Method of producing castings with relatively fine finish and within dimensional tolerances much lower than obtained by conventional greensand molding methods. Equipment requirements for both relatively large production setups and experimental work. Equipment requirements for setting up a mechanized shell-molding unit, types of shell-making machines available, and proposed layouts for commercial production. Photographs and diagrams. (E16)

5-E. Longer Life Cast Into Modern Slag Ladle. *Foundry,* v. 80, Dec. 1952, p. 108-111, 174, 177.

Procedure for casting and finishing slag ladles. Photographs. (E11, CN)

6-E. New Method Simplifies Shell Mold Assembly. Richard Herold. *Foundry,* v. 80, Dec. 1952, p. 142, 144. (E16)

7-E. Research on Atmospheric Dust in Steel Foundries With Special Reference to the Use of Statistical Surveys. G. M. Michie and G. H. Jowett. *Foundry Trade Journal,* v. 93, Nov. 6, 1952, p. 527-535, Nov. 13, 1952, p. 563-565; disc. p. 565-569.

Use and interpretation of atmospheric dust surveys. Dust sampling and estimation and potential importance of automatic methods. Two environmental dust surveys in steel foundries were made, and data subjected to detailed statistical analysis. Results show influence on dust level of such factors as local operational process, day of week, and time of day. Statistical considerations involved in design and analysis of such surveys. Tables and graphs. 13 ref. (E general, A7, ST)

8-E. (Swedish.) **The Influence of Different Clay Bonds on the Properties of Molding Sands.** Olof Carlsson. *Gjuteriet,* v. 42, Oct. 1952, p. 157-165.

Influence of different clay bonds on properties of molding sands. Natural sodium bentonite, synthetic sodium bentonite, natural calcium bentonite, soda-treated calcium bentonite, and kaolinite clay were tested. Graphs and photographs. (E18)

9-E. What's Ahead the Next Ten Years in Casting and Molding. *American Machinist,* v. 96, Mid-Nov. 1952, p. B-B7.

Shell molding, investment cast-

ing, die casting, plastic molding, and powder metallurgy.
(E general, H general)

10-E. Carbon: A New Cupola Refractory? P. Provias. *Canadian Metals,* v. 15, Nov. 1952, p. 32-34.
Advantages. Compares properties with other common refractories. (E10)

11-E. Melting and Casting Aluminum Bronzes. James G. Dick. *Canadian Metals,* v. 15, Nov. 1952, p. 36, 38.
Melting of aluminum bronzes, and history of the process. (To be concluded.) (E11, Cu)

12-E. What Constitutes Good Foundry Practice With Aluminum and Magnesium. Hale A. Clark. *Industrial Gas,* v. 31, Nov. 1952, p. 16, 26, 28.
Suggestions to achieve sound castings and avoid gas cavities, gas porosity, inclusions, cracks, macroshrinkage, piping, hot tears, cold shorts, and segregation, intercrystalline corrosion, sweating, and surface pitting. (E25, Al, Mg)

13-E. Foundries Report on Basic Electric Arc Practices. T. N. Armstrong. *Iron Age,* v. 170, Nov. 27, 1952, p. 103-105.
A survey of 25 foundries shows trends and significant differences in melting practice. Some foundries have converted to basic furnaces while others are considering such a step. (E10, CI)

14-E. The Antioch Process. *Light Metals,* v. 15, Nov. 1952, p. 365-368.
Plaster-mold casting process and its advantages in comparison with other production methods. Emphasizes application to Al and its alloys. (E16, Al)

15-E. Porosity Due to Dross. *Metal Industry,* v. 81, Nov. 14, 1952, p. 391.
True nature of porosity. Urges securing accurate diagnosis of casting defects. Cites example of a typical Al alloy casting. (E25, Al)

16-E. Biggest in Canada: Domal's New Magnesium Foundry. *Modern Metals,* v. 8, Nov. 1952, p. 52-53.
The new Mg foundry of Dominion Magnesium, Ltd., at Haley, Ont. The 70,000-sq. ft. plant will eventually have a capacity of nearly 5 million lb. of light-metal castings per year. (E general, Mg)

17-E. Low Cost Shell Molding Machine for the Small Jobbing Foundry. *Modern Metals,* v. 8, Nov. 1952, p. 58-59.
New equipment which produces shells at a rate of 70-100 per hr. It was developed by Graduate School of Business, Stanford Univ. (E16)

18-E. (French.) **Principles and Fabrication of the "Ferodo" Hydraulic Coupling.** Marcel Avice. *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 367-374.
The casting of Al parts for the above using permanent molds and sand casting. Typical applications of the couplings. (E11, E12, Al)

19-E. (German.) **Reheat Phenomena in Steel Casting Molds.** A. Roth. *Giesserei,* v. 39, Oct. 30, 1952, p. 585-587.
Reviews the above on basis of literature, and author's observations. With proper precautions, disadvantages of phenomenon can be turned into advantages in steel casting. Diagrams. (E25, CI)

20-E. Design and Production of Shell Mold Patterns Improved. *Iron Age,* v. 170, Dec. 11, 1952, p. 172-174.
The use of cast iron, steel, and Al for patterns and the processing and treatment of molds for satisfactory service.
(E16, E17, CI, ST, Al)

21-E. The Shell Moulding Process. *Machinery* (London), v. 81, Nov. 28, 1952, p. 1111-1116.
Methods employed by Polygram Casting Co., Ltd., Chiswick, London, which has carried out considerable development work in connection with applications of the process. (E16)

22-E. Segregations in Lead Bronze Bush. *Metal Industry,* v. 81, Nov. 28, 1952, p. 427-428.
Importance of melting procedure is emphasized in this example of casting trouble. Its correction necessitated attention to a number of points simultaneously. Photographs and micrographs. (E25, Cu)

23-E. (Book.) **The Brass Foundry.** 173 pages. 1951. Anglo-American Council on Productivity, 2 Park Ave., New York 16, N. Y.; or 21 Tothill St., London, S.W. 1, England.
Report of a British visit to U. S. where 21 plants were observed.
(E general, Cu)

24-E. (Book—Italian) **(Handbook of Aluminum Casting.) Manuale di Fonderia d'Alluminio.** 476 pages. 1949. Ulrico Hoepli, Milan, Italy. Paper 2500 lire, Bound 3300 lire.
History of Al casting, including melting, dies, casting, finishing, casting defects, heat treatment, material testing, and analyzing. The common alloys trade-names, their mechanical and physical properties, standards, and the Italian and foreign owners of patents and licenses are tabulated. Appendix contains, besides the usual conversion tables, 884 designations of cast alloys with their composition and producers.
(E general, Al)

25-E. (Book.) **Pattern Design.** Ed. 2. Henry E. Kiley and John H. Paustian. 193 pages. 1952. International Textbook Co., Scranton, Pa.

Pattern details, molding details, materials used in pattern construction, construction work and joints, design for low-cost production, pattern-department management, special designs, explanation of work required in planning pattern equipment, and problems in pattern design. (E17)

26-E. (Book.) **Yankee Iron.** 140 pages. Eastern Malleable Iron Co., Naugatuck, Conn.

An unusual book telling dramatic and moving story of development and life of Eastern Malleable Iron Co. (From review in *Iron Age*) (E general)

27-E. Advantages and Disadvantages of Light Metal Melting Equipment. Hiram Brown. *American Foundryman*, v. 22, Dec. 1952, p. 36-41.

Pit and tilt-type furnaces, stationary-type furnaces, induction furnaces, electromagnetic pumping, low frequency advantages, high frequency furnaces, lift coil furnace, melting pot compositions, cleaning Al pots, and pots for Mg. Diagrams and photographs. (E10, Mg, Al)

28-E. Shell Molding and Coremaking Adapted to the Small Shop. Wilbur S. Walters. *American Foundryman*, v. 22, Dec. 1952, p. 42-45.

Production and procedure for iron castings. Photographs. (E16, CI)

29-E. Strong Aluminum Casting Alloys. Donald L. Colwell. *American Foundryman*, v. 22, Dec. 1952, p. 60-65.

High strength in Al castings can be developed in certain alloys without heat treatment, saving production time and cost, and avoiding distortion which sometimes results during heating or quenching. Typical castings. How intermetallic compounds formed in the alloys promote the high strengths. Photographs, tables, and graphs. 11 ref. (E25, Q23, Al)

30-E. Retriever Unloads Diecaster Automatically. Robert E. Fromson. *American Machinist*, v. 96, Dec. 22, 1952, p. 100-101.

New automation device eliminates heavy handling of hot die-cast rotors, and operates in times sequence with die-casting machine and indexing slat conveyor. (E13, Al)

31-E. Synthetic Resins in the Foundry. D. N. Buttrey. *British Plastics*, v. 25, Dec. 1952, p. 410-415.

Urea and phenolic resins suitable for core binding, and procedures for satisfactory operations. (E18)

32-E. Rotary Melting Furnaces. *Machinery Lloyd* (Overseas Ed.), v. 24, Nov. 1952, p. 79-80.

New developments for melting or refining cast iron, steel, Cu, Al, and gunmetal. (E10, ST, CI, Cu, Al)

33-E. Production of Serviceable Non-Ferrous Castings by Exploiting Mold-Reaction Effects. W. A. Baker. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 321-324.

The prevention of shrinkage porosity in castings. (E25)

34-E. Melting and Casting Aluminum Bronzes. (Concluded.) James G. Dick. *Canadian Metals*, v. 15, Dec. 1952, p. 32, 34, 36.

Shrinkage and dross-forming characteristics, alloy composition, post-casting treatment, and effects of other elements in alloys. (E10, E25, Cu)

35-E. New Precision Investment Foundry. Ted Operhall. *Foundry*, v. 81, Jan. 1953, p. 86-93, 172, 174, 176, 178.

The investment casting process. Equipment and control measures being practiced at the Whitehall Division of Michigan Steel Casting Co. (E15)

36-E. New Pressure Pipe Foundry Serves West Coast Area. *Foundry*, v. 81, Jan. 1953, p. 98-101.

Plant layout and equipment for centrifugally casting iron pressure pipe at the United States Pipe and Foundry Co., Decoto, Calif. (E14, CI)

37-E. The "Ideal" Steel Jobbing Foundry. Harry G. Schlichter. *Foundry*, v. 80, Dec. 1952, p. 84-89, 251-262; v. 81, Jan. 1953, p. 102-107, 257-260.

Steps in modernizing a steel jobbing foundry. Facilities required to achieve efficient operations. Diagrams and photographs. (E general, CI)

38-E. Effect of Raw Materials on Cupola Operation. (Concluded) Bernard P. Mulcahy. *Foundry*, v. 81, Jan. 1953, p. 158, 160.

Effect on melt quality of equipment employed and manner of charging raw materials into the cupola. (E10, CI)

39-E. Manufacture of Precision Patternplates. Bernard Faure. *Foundry Trade Journal*, v. 93, Dec. 25, 1952, p. 723-727.

Basic principles and method of developing a system for carrying out production rapidly and economically on an industrial scale. Diagrams. (E17, CN)

40-E. Synthetic Resins as Sand Bonds. P. G. Pentz. *Foundry Trade Journal*, v. 93, Dec. 25, 1952, p. 729-733.

Characteristics and performance

of current types of synthetic resin under actual foundry conditions, with emphasis on practical difficulties. Promising developments in characteristics of resins and methods of using them in the foundry. Graphs. (E18)

41-E. How to Increase Your Die-casting Output. L. F. Spencer. *Iron Age,* v. 171, Jan. 8, 1953, p. 93-98.

Better equipment enables castings to be made from Zn, Al, Mg, and Cu-base alloys. Equipment and die steels. Photographs and tables. (E13, Zn, Al, Mg, Cu, TS)

42-E. Bakelite Resins for Shell Moulds and Cores. *Machinery* (London), v. 81, Dec. 12, 1952, p. 1240-1241.

Brief discussion. (E18)

43-E. Titanium and Zirconium Casting Now Practicable. W. E. Kuhn. *Materials & Methods,* v. 36, Dec. 1952, p. 94-95.

New process by which castings ranging from several grams to several pounds can be produced by arc melting and casting. (E16, E10, Ti, Zr)

44-E. High Speed Die-Castings. *Metal Industry,* v. 81, Dec. 12, 1952, p. 466-470.

Examples emphasizing features of automatic pressure die casting of Zn and Zn alloys. (E13, Zn)

45-E. Quality Considerations for Bronze Castings. Harold J. Roast. *Metal Progress,* v. 62, Dec. 1952, p. 91-92.

Recent progress in the bronze foundry. (E general, Cu)

46-E. Grain Refinement of Magnesium Castings. R. T. Wood. *Modern Metals,* v. 8, Dec. 1952, p. 65-66, 68.

Grain refining method employed in Alcoa's Mg foundries. Tables. (E25, Mg)

47-E. Large Magnesium Airframe Castings. Ray Osbrink. *Modern Metals,* v. 8, Dec. 1952, p. 68-69.

Brief discussion. (E general, Mg)

48-E. Magnesium Investment Castings. P. L. Butler. *Modern Metals,* v. 8, Dec. 1952, p. 69-70.

Brief discussion on precision investment casting. (E15, Mg)

49-E. Magnesium and the Shell Molding Process. A. J. Marcotta. *Modern Metals,* v. 8, Dec. 1952, p. 70, 72.

Brief discussion. (E16, Mg)

50-E. High Production Dielectric Core Baking Is Large Step Toward Improved Castings. Lewis B. Reed. *Western Metals,* v. 10, Dec. 1952, p. 64-65.

Advantages. Photographs. (E21)

51-E. The Effect of Moisture on the Amount of Dust Produced by Foundry Sand. J. Bright and F. M. Shaw. *British Cast Iron Research Association, Journal of Research and Development,* v. 4, Dec. 1952, p. 426-429.

Summarizes series of tests carried out on a number of natural and synthetic sand mixtures in an attempt to establish minimum moisture content at which dust ceases to be generated by foundry sand. Tables and photographs. (E18)

52-E. The Shell Moulding Process. W. B. Parkes. *British Cast Iron Research Association, Journal of Research and Development,* v. 4, Dec. 1952, p. 445-452; disc., p. 453-456.

Process and pattern equipment, dump box, sand, resin, sand mixing, application and curing, stripping, assembly and pouring, gatings of castings, quality of castings produced, and shell cores. (E16)

53-E. Heat Control in Die Casting Dies. H. K. Barton. *Machinery* (London), v. 81, Dec. 26, 1952, p. 1327-1332.

General discussion based on dies used with Zn-base alloys. Mention is made of BeCu inserts. (E13, Zn)

54-E. The Mechanism of Nodular Graphite Formation in Cast Iron. Isao Aoki. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 273-282.

When CuMg alloy is added to molten Fe, the alloy splits into small particles of liquid and is partially dissolved. When Si is added as inoculant, graphite precipitates on the undissolved particles and grows spherically. Micrographs. (E25, CI)

55-E. (Portuguese.) **Paints in Casting.** Carlos Dias Brosch. *ABM Boletim da Associacao Brasileira de Metais,* v. 8, July 1952, p. 225-233.

Use of paint for surface protection of molds and cores, for improving surface finish of castings, and for modifying surface structure of the cast metal. Micrographs and tables. (E19, E21, L26)

56-E. (Book.) **Investment Castings for Engineers.** Rawson L. Wood and Davidlee von Ludwig. 477 pages. 1952. Book Division, Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $10.00.

The salient features, advantages and limitations of investment castings as they are employed in the metalworking industries. Present design and metallurgical limits are clearly defined, as are the degrees of cast tolerance control now commercially obtainable. Recent techniques, including the frozen mercury method. (E15)

57-E. Measure Ferrous Metal Fluidity. F. C. Langenberg and R. D. Stout. *American Foundryman,* v. 23, Jan. 1953, p. 44-47.

Makes use of a permanent steel mold. (E25, Fe)

58-E. Cupola Melting and Control for Machine Tool Castings. A. J. Dublo. *American Foundryman,* v. 23, Jan. 1953, p. 53-57.

Techniques of Sterling Foundry Co. for obtaining high quality castings. (E10, CI)

59-E. Automatic Fume Collection Solves Air Pollution Problem. J. E. L'anson, T. L. Harsell, Jr., and R. T. Pring. *American Foundryman,* v. 23, Jan. 1953, p. 61-64.

Equipment installed by Lincoln Foundry Corp., Los Angeles, designed to reduce emissions from its cupola. Problems involved, equipment design, and results. Tables and schematic diagram. (E10, A5, CI)

60-E. Advantages and Limitations of Olivine Molding and Core Sand. Wm. A. Snyder. *American Foundryman,* v. 23, Jan. 1953, p. 65-68. (E18, CI)

61-E. On Steel Castings by the Shell Moulding Process. M. J. Sargeaunt. *British Steelmaker,* v. 19, Jan. 1953, p. 26-29.

The process and success with alloy steels. Advantages. (E16, AY)

62-E. Mechanized Shell-Moulding Process. *Engineering,* v. 175, Jan. 9, 1953, p. 44-45.

Briefly described and illustrated. (E16)

63-E. The Principles of Risering. Charles F. Walton. *Foundry,* v. 81, Feb. 1953, p. 100-107, 244-245.

Four reasons for using risers, various riser systems, and errors encountered. Photographs. (E22)

64-E. A Cause of Surface Porosity in 7 Per Cent Silicon Aluminum Castings. Clinton F. Zabriskie. *Foundry,* v. 81, Feb. 1953, p. 112-113.

Brief discussion. Photographs and tables. (E25, Al)

65-E. Plaster Cores Formed in Plastic Corebox. Gilbert C. Close. *Foundry,* v. 81, Feb. 1953, p. 132, 134.

Cores used for casting Al alloy turbine impeller wheels. Photographs. (E21, Al)

66-E. Casting Design Improved by Welding. Arthur L. Phillips. *Foundry,* v. 81, Feb. 1953, p. 148, 151.

Advantages of casting smaller parts and welding them into the finished product. (E general, K general)

67-E. Surface Finish and Facing Sands. Roy Pell. *Foundry Trade Journal,* v. 94, Jan. 1, 1953, p. 5-12.

Experiments to determine types and compositions of sands for Fe and gunmetal castings from a few ounces to 5 tons. Diagrams and photographs. (E18, CI, Cu)

68-E. Fettling of Mass-Production Castings. R. P. Henricks. *Foundry Trade Journal,* v. 94, Jan. 1, 1953, p. 13-17.

Uses of various fettling equipment. How appearance of the casting may be improved by modern practice. (E10, CI)

69-E. Core-Assembly as a Production Aid to the Jobbing Founder. E. H. Beech and J. Hoyes. *Foundry Trade Journal,* v. 94, Jan. 8, 1953, p. 33-39; Jan. 15, 1953, p. 71-78.

Foundry layout, typical castings, labor, planning of core-assembly, packing blocks, and gear-case casting. Second part: Block-pattern condenser shell, suppression of dust, exhaust casing, and compressor half-casing. Photographs. (E11)

70-E. Solidification Rate of Cast Iron. *Foundry Trade Journal,* v. 94, Jan. 15, 1953, p. 59-62.

Method in which thermocouples are placed in selected positions in the mold cavity or in the sand to record temperature changes from moment of pouring metal into mold until solidification occurs. (E23, S16, CI)

71-E. Principles of Gating. Review and Bibliography of Previous Investigations. G. Martin. *Foundry Trade Journal,* v. 94, Jan. 15, 1953, p. 63-69.

General discussion of turbulence effects and flow through a gating system. 58 ref. (E22)

72-E. Where Shell Mold Castings Stand Today. Kenneth Rose. *Materials & Methods,* v. 37, Jan. 1953, p. 73-77.

Specific cost figures and an appraisal of properties of castings produced by the Croning or "C" process. Photographs show castings of gray iron, Al, bronze, stainless steel, Mg, Ni-Ag, malleable iron and Mg-bronze. (E16, CI, Al, Cu, SS, Mg)

73-E. How to Buy Aluminum Castings. Floyd A. Lewis. *Materials & Methods,* v. 37, Jan. 1953, p. 95-100.

Selection rests on consideration of engineering properties, cost, design possibilities, and production rates obtainable with sand, permanent mold, or die casting. Photographs and tables. (E11, E12, E13, Al)

74-E. Mechanical Metal-Charging. H. K. Barton. *Metal Industry,* v. 82, Jan. 2, 1953, p. 7-8.

Automatic ladling in cold chamber die-casting machines. (E13, Al)

75-E. Die-Castings in the Dictaphone Time-Master. *Metal Industry,* v. 82, Jan. 9, 1953, p. 26-29.

Parts cast from Zn-base, Al-base, and Mg-base alloys. (E13, T10, Zn, Al, Mg)

76-E. Porous Gunmetal Bush. *Metal Industry,* v. 82, Jan. 9, 1953, p. 31-32.

Investigation which indicated that sand conditions may result in poor castings. (E11, Cu)

77-E. Control Keynotes Unusual Foundry. Gordon B. Ashmead. *Western Machinery and Steel World,* v. 44, Jan. 1953, p. 68-71, 97.

Precision in casting hard-to-cast objects from Meehanite iron. Photographs. (E11, CI)

78-E. (Dutch.) **The Effect of Baking Time and Temperature on the Properties of Oil-Sand Cores.** A. J. Zuithoff and W. van Stam. *Metalen,* v. 7, Nov. 30, 1952, p. 401-407.

Importance of time and temperature control in order to obtain optimum properties. Testing equipment and charted data. (E21)

79-E. (French.) **Precision Casting With the Lost Wax Process, and Its Application to the Casting of Small Pieces of Steel and Refractory Alloys.** E. Morlet. *Métaux Corrosion—Industries,* v. 27, Oct. 1952, p. 401-413.

Details of the process, such as manufacture of wax forms, casting, finishing, and modifications for specific materials. Diagrams and photographs. (E15, SS)

80-E. (German.) **On Measuring the Gas Content of Cores.** F. Roll. *Giesserei,* v. 39, Nov. 13, 1952, p. 603-606.

Four methods and the equipment. Test data are tabulated and charted. (E18)

81-E. (German.) **Causes and Ways of Minimizing Casting Flaws in Zinc Pressure Die Castings.** F. Richter. *Giesserei,* v. 39, Nov. 27, 1952, p. 625-630.

Microporosity of castings; behavior of plated coatings; ways of eliminating flaws; and additional uses for plated scrap. Photographs. (E13, Zn)

82-E. (German.) **Casting Under Extreme Conditions.** E. Schmid. *Metall,* v. 6, Dec. 1952, p. 737-744.

Vacuum casting, casting under pressure, extremely rapid and extremely slow solidifiction, and the significance of mechanical vibrations during solidification. Charts and diagrams. 35 ref. (E25)

83-E. (Swedish.) **Aspects of the Design of Pneumatic Molding Machines.** J. Broberg and L. Villner. *Gjuteriet,* v. 42, Nov. 1952, p. 175-178, 179-184, 185-188, 189-191.

Numerous points which should be considered. Photographs and drawings. (E19)

84-E. (Swedish.) **A Swedish Automatic Molding Machine.** R. Orban. *Gjuteriet,* v. 42, Dec. 1952, p. 199-202.

A fully automatic machine. Time for separate operations can be adjusted and it can be operated semi-automatically. (E19)

85-E. Contribution to Ingot-Mold Making. E. Feil. Henry Brutcher, Translation 2894, 18 pages.

Previously abstracted from *Die Giesserei.* See item 583-E, 1951. (E12, CI)

86-E. Impregnation Salvages Porous Castings. *Canadian Metals,* v. 16, Jan. 1953, p. 34-35.

Use of resins for impregnating ferrous and nonferrous metals. (E25, Fe, EG-a)

87-E. (French.) **The Rational Utilization of Coke for Heating of Foundry Ovens.** M. G. Ulmer. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 44, 10 pages.

Experimental oven, and results of experiments on the operation of the coke furnace. Diagrams, charts, and photographs. (E10)

88-E. (French.) **Developments of Induction Heating at Intermediate Frequencies for the Foundry and Through Heatings.** J. Minssieux. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 109, 8 pages.

General discussion on induction heating plus notes on choice of frequency, as well as some operating characteristics of induction melting furnaces. Different types of generators for furnaces and heat treatment apparatus, as well as installations for forging. Photographs. (E10, F21, J2, ST, Cu, Ni)

89-E. (French.) **High-Frequency Driers. Description of Modern Driers.** Marc F. Degros. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 201, 6 pages.

Some applications of dielectric drying in food production, textile industry, and the foundry. (E21)

90-E. (French.) **"Philipon" Hot-Air Cupola-Gas Generator.** M. Boutigny and H. Philipon. *Fourth International Congress on Industrial Heating* (Paris), No. 206, 3 pages.

Advantages over cold-air cupola-gas generator. Schematic diagram of apparatus. (E10)

91-E. Feeding Heads. I and II. M. R. Hinchcliffe. *Metal Industry,* v. 82, Jan. 16, 1953, p. 43-46; Jan. 23, 1953, p. 67-70.

Application of "Feedex" in conjunction with a neckdown technique for feeding heads. Principles and details of process. Graphs, tables, and diagrams. 11 ref. (E22)

92-E. Foundry Facilities Molded to Production. *Steel,* v. 132, Feb. 2, 1953, p. 102-103.

Use of squeezer machines and other innovations for increasing

production and lowering costs of iron and bronze castings. Photographs. (E11, CI, Cu)

93-E. Ultrasonic Vibrations and Their Metallurgical Applications. K. F. Alder. *Australasian Engineer,* Dec. 8, 1952, p. 53-59.

Methods of generating ultrasonic vibrations, particular emphasis being placed on phenomenon of magnetostriction and its application in ultrasonic transducers. Review of metallurgical applications of high-frequency vibration is given, with attention concentrated on grain refinement of castings. 28 ref. (E25, P10, P16)

94-E. Modification of Aluminium-Silicon Alloys. R. H. Dyke. *Foundry Trade Journal,* v. 94, Jan. 22, 1953, p. 91-96.

Mechanism, investigation of modification by NaCl/F flux, modification with low-melting-point ternary flux, and modification using Na metal. Photographs and micrographs. 24 ref. (E25, Al)

95-E. Shell-Moulding and the Plastics Industry. *Foundry Trade Journal,* v. 94, Jan. 22, 1953, p. 97.

Describes use of plastics in the foundry. (E19)

96-E. Foundry Sand Control. Special Application to Synthetic Sand Practice. A. Tipper. *Foundry Trade Journal,* v. 94, Jan. 22, 1953, p. 99-101.

Characteristics of molding sands which are of particular importance to foundrymen in producing good molds and castings. Reviews methods used for routine sand control, investigates sand properties, and possible causes and cures for certain sand troubles. (E18)

97-E. Non-Ferrous Foundry Transferred. Developments at George Kent, Limited. *Foundry Trade Journal,* v. 94, Jan. 22, 1953, p. 103-105.

New location and layout of above plant. (E general, A5, EG-a)

98-E. Designing an Ideal Sand Casting. T. H. Trevithick. *Product Engineering,* v. 24, Feb. 1953, p. 168-170.

Review of factors that make a casting ideal from a production as well as a functional viewpoint. Diagrams. (E11)

99-E. (Pamphlet.) **The Application of Shell Molding to the Production of Magnesium Castings.** Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., PB111049, Feb. 10, 1953. $.75.

Description of practical application of principles evolved for shell molding Mg, and a discussion of metallurgical properties of resulting castings. (E16, Mg)

100-E. Castings With a Pedigree. Carl R. Loper, James D. Claffey, and Frank L. Waldenmeyer. *American Foundryman,* v. 23, Feb. 1953, p. 36-38.

Production of Al precision castings with controlled composition and mechanical properties. Check list of tests and properties which follow each casting from foundry to installation. Operation revolves around first dielectric unit to handle resin-bonded cores on metal plates. Photographs. (E15, Al)

101-E. New Cupola Emission Control Equipment Gives Faster Melting, Cleaner Air. *American Foundryman,* v. 23, Feb. 1953, p. 41-43.

Advantages of installation in cupola with respect to air pollution control. Photographs and diagrams. (E10)

102-E. Washburn Cores Disinterred. Pros and Cons of Necked Down Risers. J. B. Caine. *American Foundryman,* v. 23, Feb. 1953, p. 51-54.

Development of necked-down risers and why they were not successful. Present advantages and disadvantages. Diagrams and photographs. 5 ref. (E22)

103-E. Redesigning for Malleable Iron Cuts Costs, Improves Product. *American Foundryman,* v. 23, Feb. 1953, p. 55-56.

Illustrates how malleable iron castings replaced fabricated parts and the advantages gained. Use of castings resulted in lower cost, reduced weight, improved appearance, uniformity, and better machinability. Photographs. (E11, CI)

104-E. Synthetically Bonded Molding Sand. Mary T. Zemantowsky. *American Foundryman,* v. 23, Feb. 1953, p. 57-61.

Experiments to determine relationships among sintering point, bentonite water ratio, and other properties of sand mixtures. Room and high-temperature properties were considered. Graphs. 35 ref. (E18)

105-E. Advantages of Insulating an Electric Furnace Roof. Charles C. Spencer. *American Foundryman,* v. 23, Feb. 1953, p. 65-66.

Use of standard materials results in substantial savings in initial cost and uninterrupted service of furnace roofs. Photographs. (E10)

106-E. "Push-Button" Control of Metal Composition Envisaged. *Foundry Trade Journal,* v. 94, Jan. 29, 1953, p. 119-123.

Cupola-charging system; theory and practice; working results. Photographs and tables. (E10, CI)

107-E. Present Developments and Future Trends in the Cast Iron Industry. John McGrandle. *Foundry*

Trade Journal, v. 94, Jan. 29, 1953, p. 125-129.

Forces governing present tendencies are discussed and an attempt is made to indicate how far these developments may affect iron-founding industry. 10 ref. (E general, CI)

108-E. Mould Reaction. R. W. Ruddle. *Foundry Trade Journal,* v. 94, Feb. 5, 1953, p. 145-152.

Occurrence of mold reaction may, in certain circumstances, lead to an improvement in soundness of casting. Photographs, diagrams, and graphs. 7 ref. (E25, EG-a)

109-E. Sand Burn-On in Steel Castings. *Foundry Trade Journal,* v. 94, Feb. 5, 1953, p. 157-158.

Penetration of steel into sand molds, and burn-on of sand on steel castings. (E19, CI)

110-E. Permanent Mold Process. Harold E. Bourassa. *Light Metal Age,* Feb. 1953, p. 11-13, 20.

Large production runs make relatively difficult technique practical. Photographs. (E12)

111-E. Role of the Research Foundry Unit. G. A. Lillieqvist. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 6-15.

Developments in processes, use of welding electrodes, inspection, deoxidizers, desulfurizers, and shell molding. Tables, graphs, and micrographs. 7 ref. (E general, A9)

112-E. Risering Castings. A Progress Report For 1948-1951. J. B. Caine. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 16-22.

Difficulties with use of closely spaced risers required to meet feeding distances. Methods to overcome these difficulties and to enable the foundry to produce castings free from dispersed shrinkage with minimum number of reasonably sized risers and an acceptable yield. Steel was used as the example. Diagrams. 12 ref. (E22, CI)

113-E. A Study of the A.F.S. Fineness Test. H. A. Stephens. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 53-67; disc., p. 67.

Errors due to sampling and sieving are examined. Method is developed for calibrating unknown sieves using standard sands under standard conditions. A.F.S. fineness number, and a new distribution index. Tables and photographs. 16 ref. (E18)

114-E. Manufacture of Cast Edge Tools in Rotary Furnace Steel. Gordon Keech, A. T. Batty, and W. M. Dummett. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 68-74.

Origin of process and detailed description of the various tools and their actual manufacturing procedure. Photographs and micrographs. (E10, TS)

115-E. Development of Steel Foundries in India. N. G. Chakrabarti. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 84-89.

Melting units, raw materials, refractories, fluxes, carbon electrodes for electric furnaces, furnaces, patternmaking, sand handling, molding, core-making, casting, stripping, annealing, fettling, and inspection. (E general, CI)

116-E. New Process for Nodular Iron Production at Low Treatment Cost. Carlo Longaretti and Mario Noris. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 101-107; disc., p. 107-108.

Nodulizing treatment with direct use of pure Mg or high Mg alloys. Drawbacks and advantages of process. Micrographs and photographs. (E25, CI)

117-E. Gases and Naturally Occurring (Congenital) Blowholes in Foundry Practice. Albert M. Portevin, *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 109-124.

Defines blowholes and describes states of gases in metals, origin of foundry blowholes, dissolved gases, supersaturation, agitation, nucleation, segregation at solidification, gas content in metals, gas in suspension, general character of blowholes, estimating naturally occurring blowholes, and influence of metal impurities. (E25)

118-E. A Study of the Principles of Gating as Applied to Sprue-Base Design. K. Grube, J. G. Kura, and J. H. Jackson. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 125-136.

Emphasis was placed on investigation of design of sprue base and effect of various gating ratios on casting quality. Photographs, graphs, and tables. 4 ref. (E22)

119-E. Investigation of Properties of Steel Sands at Elevated Temperatures. R. G. Thorpe, A. E. Riccardo, P. L. Widener, and P. E. Kyle. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 197-210.

Includes laboratory stress-strain and expansion studies of several synthetic steel sand mixtures at elevated temperatures. Summarizes test results on scabbing tendencies of sand mixtures. Graphs and photographs. (E18, CI)

120-E. Risering of Gray Iron Castings. W. A. Schmidt and H. F. Taylor. *Transactions of the American Found-*

rymen's Society, v. 60, 1952, p. 211-217; disc., p. 217.

Investigation to determine extent of shrinkage in gray iron castings. Photographs and diagrams. (E22, CI)

121-E. Production of Heavy Gear Wheels in Spheroidal Graphite Cast Iron. Corrado Galletto. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 223-228; disc., p. 228.

Characteristic Italian application of Mg-containing spheroidal graphite cast iron in the manufacture of heavy gears with cast teeth. Photographs. (E11, CI)

122-E. Refining and Elimination of Gases From Metals and Alloys. Henry Lepp, Florent Monneret, and Paul Rame. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 229-233.

Theory of refining and degasification of metals through method of selective oxidation, and application of this process. How brass castings of high mechanical characteristics can be made from reconditioned scrap metal without use of ingots. Photographs. 7 ref. (E25, Cu)

123-E. Influence of the Nature of Oven Atmosphere on Drying of Molds and Baking of Foundry Cores. Georges Ulmer and Maurice DeCrop. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 234-246; disc., p. 246.

Drying and baking of sand; comparative tests on core baking in confined atmosphere and in changing atmosphere; and study of drying molds in steam atmospheres. Tables and graphs. 8 ref. (E21)

124-E. Refractories for the Basic Cupola. H. M. Kraner. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 262-264; disc., p. 264-265.

Potential solubility of slag, consumption of refractory lining, and ingredients in refractory mixtures. 22 ref. (E10)

125-E. Effect of Binders and Additives on the High Temperature Properties of Foundry Sands. R. E. Mórey, C. G. Ackerlind, and W. S. Pellini. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 266-273.

Investigation to establish hot ductility characteristics of various sands. Graphs. 5 ref. (E18)

126-E. A.F.S. Safety, Hygiene, and Air Pollution Program. James R. Allan. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 279-281.

Past accomplishments and problems of the future for controlling foundry pollution. (E general, A7)

127-E. Actual Application of Motion Pictures in Foundry Motion and Timestudy. M. T. Sell. *Transactions of the American Foundrymen's Society,* 1952, v. 60, p. 308-311.

Advantages of making time and motion studies with film. (E general, A6)

128-E. Some Practical Applications of Permeable Metal Casting Plaster. R. F. Dalton. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 351-355; disc., p. 355.

Permeability of plaster molds for nonferrous metal casting. Process describes entraining of air into a formulated plaster mix wherein permeability in the mold is created by connections between finely divided air cells. Making molds for typical Al castings by this process. Photographs. 5 ref. (E16, Al, EG-a)

129-E. Production Experiences With a Basic Cupola. Sam F. Carter. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 344-350; disc., p. 350.

Refractory lining and patching; slag-hole and tap-hole refractories; effect of varying degrees of slag basicity; economic considerations; slag composition; operation; and control. Use for nodular and special irons. Tables. (E10, CI)

130-E. The Nature of Bonding in Clays and Sand-Clay Mixtures. L. M. Diran and H. F. Taylor. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 356-363; disc., p. 363.

Re-emphasizes fact that sand-clay mixtures are relatively complex aggregates and that a basic interpretation of bonding action is needed before true improvement can be made in molding mixtures. Diagrams. 10 ref. (E18)

131-E. Internal Porosity in Gray Iron Castings. John C. Hamaker, Jr., William P. Wood, and Franklin B. Rote. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 401-427; disc., p. 427-431.

Influence of P and alloys on internal shrinkage porosity in a 3.25% C (total), 2.25% Si gray iron was determined by precision density measurements on unfed 4-in. cube castings. Measurements of liquid, solidification, and solid contractions of synthetic phosphide eutectic compositions permitted calculation of theoretical 4-in. cube void volumes produced by phosphide contraction. Photographs, graphs, tables, and micrographs. 27 ref. (E25, CI)

132-E. Patternmaking to Compensate for Shrink Allowance. M. K. Young. *Transactions of the American*

Foundrymen's Society, v. 60, 1952, p. 477-481.

Application of medium-high and high-expansion gypsum cements, their characteristics, and methods of handling are set forth to illustrate versatility of materials in patternmaking for shrink allowance. Diagrams. (E17)

133-E. Refractory Selection Applied to Batch Type Air Furnaces. C. O. Schopp and P. F. Ulmer. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 497-500; disc., p. 500.

Steps necessary to select a suitable refractory for a given operation when precise methods are not applicable, due to lack of control of a major number of conditions affecting life of the refractory. Photographs. (E10)

134-E. Effect of Slag on Furnace Linings. L. B. Wyckoff. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 525-528; disc., p. 528.

Deals primarily with chemical reactions of slag on furnace linings. Considers cupola slags and acid linings. Diagrams. (E10)

135-E. New Methods in Metal Patternmaking. H. J. Jacobson. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 529-532.

Automatic chucking of castings, Al metal patterns, driers, and pin corebox. (E17, Al)

136-E. Influence of Specimen Tube Loading and Riddle Size on Molding Sand Test Results. D. I. Huizenga and K. E. Spray. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 533-535; disc., 535.

Investigation of various methods of test tube loading and of riddling sands through various sized riddles to determine their influence upon molding sand test results. Tables. (E18)

137-E. Ventilation at Non-Ferrous Melting and Pouring Operations. Herbert J. Weber. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 563-569.

Methods of exhausting typical nonferrous pouring and melting operations which were found effective and practical. Photographs. (E23, A7)

138-E. Olivine Application in the Foundry. Gilbert S. Schaller. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 558-662; disc., p. 562.

Properties of olivine, grain size classification, and corollary applications. Tables and graphs. 11 ref. (E18)

139-E. Effect of Sulphur on Fluidity of Gray Cast Iron. Lew F. Porter and Philip C. Rosenthal. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 611-616.

Series of preliminary experiments was made to develop a laboratory melting technique that would reveal effects of S. Showed that S is detrimental to fluidity only when combined with sufficient Mn to form sulfides high in Mn. Pouring temperature was an important variable in altering influence of S. Tables, graphs, and micrographs. 4 ref. (E25, CI)

140-E. A Simplified Analysis of Riser Treatments. C. M. Adams, Jr. and H. F. Taylor. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 617-622; disc., p. 622-623.

Reflects trend of experimental work in progress, develops appreciation of how heat is lost or conserved in risers, and shows mechanism by which heat is lost as it varies with riser size and metal composition. Diagrams and graphs. (E22)

141-E. Melting in a High Speed Reverberatory Furnace. R. G. Carlson and W. B. Scott. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 624-626; disc., p. 626.

Briefly describes and illustrates furnace. (E10)

142-E. Air Pollution and the Cupola. J. C. Radcliffe and W. F. Delhey. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 714-717.

Methods of measuring pollution and means of elimination. 7 ref. (E10, A7)

143-E. Factors Affecting Fluidity of Cast Iron. Lew F. Porter and Philip C. Rosenthal. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 725-735; disc., p. 735-739.

Influence of mold atmosphere, nonmetallic inclusions, fluidity test mold, fluidity variations with carbon and temperature, and effect of temperature on fluidity. Graphs. 9 ref. (E25, CI)

144-E. How Iron and Steel Melt in a Cupola. H. W. Lownie, Jr., D. E. Krause, and C. T. Greenidge. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 766-773; disc., p. 773-774.

Experiments using pig iron, cast iron, and steel. Description of cupola, operation, removing charges from cupola stack, coke conditions in frozen charges, and metal condition in frozen charges. Micrographs and photographs. (E10, CI)

145-E. Time of Formation of Spherulites in Hypo- and Hyper-Eutectic

Irons. Jack Keverian, Clyde M. Adams, and Howard F. Taylor. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 849-852; disc., p. 852-853.

Specimens of hypo and hypereutectic irons, treated with Mg and post-inoculated with ferrosilicon to nodulize graphite, were quenched from various temperatures. Evidence presented indicates spherulitic graphite precipitates in melt above eutectic temperature for both hypo and hypereutectic alloys. (E25, CI)

146-E. (German.) **Report on the Drying of Cores. Part I.** A. Brust and F. Roll. *Giesserei,* v. 39, Dec. 25, 1952, p. 678-681.

Basic principles of drying oils used as binders for sand-mold cores. Tables and graphs. (E18)

147-E. (German.) **Suggestions for Testing Procedures in the Enameling Industry.** A. Dietzel and W. Stegmaier. *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.V.,* v. 29, Oct. 1952, p. 352-356.

Testing molding sand for castings to be enameled. 11 ref. (E18)

148-E. Trouble-Shooting Die Casting Problems. W. M. Halliday. *Foundry,* v. 81, Feb. 1953, p. 86-91, 262-263; Mar. 1953, p. 196-197, 309-310, 312-313, 315-316, 318-319, 320-324, 326.

Some common defects encountered in production of die castings, together with their probable causes and methods of correcting the difficulties. Part II: Symptoms, causes, and remedies for defects relating to surface finish and physical properties of castings. (E13)

149-E. Ford's Cleveland Foundry. *Foundry,* v. 81, Mar. 1953, p. 138-189.

A series of articles describing coremaking, molding, melting, cleaning, and ventilating. Extensive photographs. (E general, A5)

150-E. Casting Design in Relation to Production. J. H. Pearce and G. D. Whitehouse. *Foundry Trade Journal,* v. 94, Feb. 12, 1953, p. 179-185.

Cooperation between designer and foundryman and proper design for good foundry practice. Diagrams and photographs. (E general)

151-E. Dressings for Dies. W. M. Halliday. *Foundry Trade Journal,* v. 94, Feb. 12, 1953, p. 189-191.

Deals with built-up deposits of molten alloy on die cavity wall. Preventive measures which can be applied to dies. (E13)

152-E. Sand Reclamation at Lynchburg Foundry. Larson E. Wile. *Foundry Trade Journal,* v. 94, Feb. 19, 1953, p. 207-215.

Sand-reclamation unit which reduces cost of core mixtures, diminishes waste sand disposal, and minimizes delivery difficulties. Diagrams, photographs, and tables. (E18)

153-E. Small Zinc Die Castings. Louis H. Morin. *Machinery* (London), v. 82, Jan. 30, 1953, p. 209-216.

Describes wide variety of die castings now produced and illustrates "transfer finger" and "gripper" arrangements. (E13, Zn)

154-E. Die-Cast Components in Gestetner Duplicators. *Metal Industry,* v. 82, Feb. 6, 1953, p. 105-108.

Advantageous use of pressure die castings. (E13, T10, Zn, Al)

155-E. Die Caster Features Two-Stage Injection. *Steel,* v. 132, Feb. 23, 1953, p. 96.

New die forge casting machine employing "cold-chamber" method of injection, but introducing a new principle which provides for rapid fill while metal is molten. High final squeezing pressure prevents shrinkage voids and excessive porosity. (E13)

156-E. Practical Aspects of Olivine as a Molding Material. John Sissener and Bjorn Langum. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 38-42; disc., p. 43.

Previously abstracted from *American Foundryman;* item 274-E, 1952. (E19, CI)

157-E. Reclaiming Used Molding Sand by Air Scrubbing. H. H. Fairfield, James McConachie, and H. F. Graham. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 296-299; disc., p. 299.

Previously abstracted from *Canadian Metals;* item 427-E, 1952. (E18)

158-E. Practical Suggestions for the Building of Wood Patterns. W. H. Siebert. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 548-550; disc., p. 551.

Previously abstracted from *American Foundryman;* item 272-E, 1952. (E17)

159-E. Solar Makes Stainless Alloy Castings in New Shell Molding Foundry. *Western Metals,* v. 11, Feb. 1953, p. 50-52.

Advantages of using shell molding process. Photographs. (E16, SS)

160-E. (French.) **Some Remarks on Risers, Especially Atmospheric Risers.** Jean Gélain. *Fonderie,* Nov. 1952, p. 3163-3182.

Theoretical and practical aspects such as shape and size of risers; their range of effectiveness; feeding; and special problems of gray castings. (E22, CI)

161-E. Evaluating Cast Design. Robert J. Franck. *Machine Design,* v. 25, Mar. 1953, p. 104-108.

Economical production and full utilization of inherent advantages of castings for critical components can be secured by systematic designing. Photographs. (E general)

162-E. Tire Molds. An Advanced Example of the Casting Art. *Metal Progress,* v. 63, Feb. 1953, p. 97-104.

Making tire patterns and molds. Diagrams and photographs. (E16, Al)

163-E. (French.) **Study of Microshrinkage in Aluminum Alloy Castings.** Marcel Bardot. *Fonderie,* v. 83, Dec. 1952, p. 3207-3226.

Detailed study. Micrographs, tables, and diagrams. 12 ref. (E25, Al)

164-E. (Book) **Transactions of the American Foundrymen's Society.** V. 60. 862 pages. 1952. American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill.

Texts of 100 technical papers, majority of which were abstracted separately, including exchange papers from foreign foundrymen's associations; transcripts of discussions following each paper. (E general)

165-E. How Foundrymen Can Get the Most From Naturally Bonded Sands. Clyde A. Sanders. *American Foundryman,* v. 23, Mar. 1953, p. 36-40.

Advantages and disadvantages of natural molding sands and how to use them properly. Photographs. (E18)

166-E. How to Standardize and Set Up Multiple Molding in a Malleable Shop. Joseph G. Kropka. *American Foundryman,* v. 23, Mar. 1953, p. 44-49.

Methods of sand handling, molding, pouring, and shakeout operations. Tests and equipment used. Need for standardizing flasks, machines, and molding procedure to meet specifications and production requirements. Recommends constant checking to insure quality of products. Photographs. (E19, CI)

167-E. Basic Cupola Operation. Dephosphorization of Iron. Jack E. Bolt. *American Foundryman,* v. 23, Mar. 1953, p. 50-53.

Dephosphorization can be accomplished in basic cupola operation using insulation between shell and basic brick lining and sufficient coke to maintain slag and metal fluidity. Graphs and tables. (E10, CI)

168-E. Practical Foundry Applications of Principles of Ratio Gating. L. L. Lucas. *American Foundryman,* v. 23, Mar. 1953, p. 54-58.

Experiments and actual applications of ratio gating used on several hundred thousand castings of Al-base alloy cooking utensils. Photographs. (E22, Al)

169-E. Foundrymen Can't Know Too Much About Practical Heat Transfer. William S. Pellini. *American Foundryman,* v. 23, Feb. 1953, p. 69-76; Mar. 1953, p. 59-69.

Analogue studies are compared with direct experiment. Rough approximation of freezing times; effect of metal variables on solidification; mold variables; effect of chill size; and dry and green sand effects. Graphs and diagrams. (E25)

170-E. Progress of Spheroidal-Graphite Iron. W. W. Braidwood. *Foundry Trade Journal,* v. 94, Feb. 26, 1953, p. 231-236.

Progress in controlled production of nodular cast iron. Photographs. 14 ref. (E25, CI)

171-E. Surface Defects on Steel Castings. Modes of Occurrence and Means of Prevention. D. V. Atterton. *Iron & Steel,* v. 26, Mar. 1953, p. 93-97.

Dirt spots, inclusions, cold laps, misruns, blowholes, blows, pinholes, metal penetration, burnt-on sand, scabs, buckles, and drops. Graphs and diagrams. 24 ref. (E25, S13, CI)

172-E. The Control of Quality in Melting and Casting Magnesium Alloys for Hot Working. R. G. Wilkinson and S. B. Hirst. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 393-400.

Present practices in quality control and inspection in the melting and casting of three principal types of Mg alloys. Tables. (E10, S12, Mg)

173-E. Producing High-Quality Iron Castings in Shell Moulds. Methods Employed by Macmillan Foundries, Ltd., Watford. *Machinery* (London), v. 82, Mar. 6, 1953, p. 419-426.

Investment mixture, pattern materials, method of reinforcing shells, use of shell cores, and pouring procedure. (E16, CI)

174-E. Aluminium Pressure Die-Casting Dies. Their Failure by Surface Cracking. H. J. Sharp. *Metal Industry,* v. 82, Feb. 20, 1953, p. 141-143; Feb. 27, 1953, p. 164-166; Mar. 6, 1953, p. 181-184.

Mechanism of failure and variables including injection speed and pressure; die and metal temperature; die dressings; water cooling; and starting-up procedure. Includes investigations using actual dies. Micrographs, graphs, tables, and diagrams. (E13, Al)

175-E. Production Methods in the Enamelling Shop. H. M. Hibberd. *Sheet Metal Industries,* v. 30, Mar. 1953, p. 233-236.

Controlled procedure for casting and enamelling cast iron. (E11, L27, CI)

176-E. Media for Fluxing, Purifying, Degassing, Desulfurizing, and for Preventing Shrinkage Cavities in Nonferrous Metals, and Iron and Steel Castings. E. Piwowarsky. Henry Brutcher Translation 2897, 15 pages.

Previously abstracted from *Giesserei.* See item 588-E, 1951. (E25)

177-E. Pressure Tightness in Bronze Castings. M. J. Davison. *Canadian Metals,* v. 16, Feb. 1953, p. 32, 34, 36; Mar. 1953, p. 28, 30, 32.

Discusses shrinkage and gas as factors contributing to microporosity. (E25, Cu)

178-E. Calcium Carbide Injection Is New Tool in Gray Iron Metallurgy. Harvey E. Henderson and Philip M. Hulme. *Foundry,* v. 81, Apr. 1953, p. 86-91, 241-248.

How CaC_2 can be used to desulfurize, upgrade, and spheroidize low-tensile-strength iron. Tables, photographs, and diagrams. (E25, CI)

179-E. Zircon and Its Foundry Applications. W. M. Peterson. *Foundry,* v. 81, Apr. 1953, p. 92-95.

Desirable properties of zircon and how to make use of them in the foundry. Photographs. (E25)

180-E. High-Speed Molding is Done Automatically. William G. Gude. *Foundry,* v. 81, Apr. 1953, p. 98-101.

Automatic molding unit in a steel foundry. (E21, CI)

181-E. Induction Melting in a Nonferrous Jobbing Foundry. Vaughan C. Reid. *Foundry,* v. 81, Apr. 1953, p. 102-107.

Equipment and installation for melting Al, high-conductivity pure Cu, Mallory alloys, and high-strength Cu-base alloys. (E10, Al, Cu)

182-E. Close Control Important in Making Intricate Aluminum Castings. Robert H. Herrmann. *Foundry,* v. 81, Apr. 1953, p. 108-113.

Control and inspection in molding and casting Al parts. Green sand, permanent molds, and a few plaster molds are used. (E11, E12, E16, Al)

183-E. Metallurgical Developments in Iron Foundries. A. J. D. Black. *Foundry Trade Journal,* v. 94, Mar. 12, 1953, p. 291-298.

Reviews recent progress in forming irons of clearly identified structures and properties produced by various methods of metallurgical control. Micrographs. (E25, CI)

184-E. Mechanized Foundry for Small Blackheart Malleable Castings. J. Roxburgh. *Foundry Trade Journal,* v. 94, Mar. 19, 1953, p. 321-331.

Molding machine practice; sand preparation and handling; molding and conveyer synchronization; cored work; jacketing, pouring, and shakeout; melting plant; and metal provision. Photographs. (E11, CI)

185-E. Mass-Production Casting by Investment Moulding. *Foundry Trade Journal,* v. 94, Mar. 19, 1953, p. 333-336.

History and present-day status of process for producing accurate castings. (E15)

186-E. The Control of Quality in the Melting and Casting of Aluminium Alloys for Working. R. T. Staples and H. J. Hurst. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 377-391.

Effects of the alloying additions, impurities, and incidental contaminants on foundry practice, setting up of quality standards, and the ultimate properties of the material. Indicates degree of control possible through routine physical and chemical inspection at various stages. 18 ref. (E10, S general, Al)

187-E. Making Coronation Bells in Shell Moulds. *Machinery* (London), v. 82, Mar. 13, 1953, p. 475-480.

Construction of molds, sand mixtures, and production of bells. Photographs. (E16, Cu)

188-E. Shell Moulding With Urea-Formaldehyde Resins. *Machinery* (London), v. 82, Mar. 20, 1953, p. 526-532.

Choice of sand, pattern making, mold ejection, investment, core making, pouring, gating, and running. Photographs. (E16)

189-E. How X-3 Car Wheels Are Made. *Railway Age,* v. 134, Apr. 6, 1953, p 84-87

Advantages of the new design, graphite mold, pouring carbon steel, wheel design details, service tests, and static plate tests. Photographs. (E11, S21, CN)

190-E. Practical Contributions to the Study of Spheroidal Graphite Cast Iron. E. Piwowarsky. Henry Brutcher Translation 2927, 31 pages. (From *Giesserei Technisch-Wissenschaftliche Beihefte,* no. 6-8, 1952, p. 311-322.)

Experiments on the nodulizing effects of various additions to gray cast iron and on methods of introducing such additions into the melt. (E25, CI)

191-E. (German.) Research on 99.999 Zn Alloys. Wilhelm Hofmann, Friedrich Erdmann-Jesnitzer, and Heinrich Hanemann. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 417-421.

Zn die-casting alloys of Zn-Al and Zn-Al-Cu types were melted using 99.99 and 99.999 Zn. Reports results. Tables and graphs. (E13, Zn)

192-E. Foundry Characteristics of Aluminum and Magnesium. M. N. Martinson. *Canadian Metals,* v. 16, Feb. 1953, p. 28, 30; Mar. 1953, p. 34, 36.

Compares foundry characteristics of Al and Mg. Recommends procedures in all phases of foundry operations. The furnaces used and correct melting practices. Tables. (E general, Al, Mg)

193-E. Production of Nodular Iron With Calcium. Luiz Antonio de Araujo. *Colorado School of Mines, Quarterly,* v. 48, Jan. 1953, p. 47-67.

History, theories, and experimental work using Ca. Tables and micrographs. (E25, CI)

194-E. The Casting of Milling Cutters of Grey Cast Iron With Carbide Inserts. P. V. Paukov. *Engineers' Digest,* v. 14, Mar. 1953, p. 86, 90. (Translated and condensed from *Stanki i Instrument,* no. 4, 1952, p. 22-24.)

Designs of molds and techniques which insure good castings and long life of molds. (E11, T5, CI)

195-E. Ramming Cores With Reclaimed Sand. Harold W. Haynes. *Foundry Trade Journal,* v. 94, Mar. 26, 1953, p. 347-350.

An impeller-type rammer for producing certain types of cores. Diagrams and photographs. (E21)

196-E. The "C" Process of Casting. M. C. Dixon and R. S. Bushnell. *Foundry Trade Journal,* v. 94, Mar. 26, 1953, p. 355-364.

History, general properties, and costs of the process. Resins, sands, patterns, molding cycle, core preparation, and casting. Photographs. (E16)

197-E. A Method of Centrifugally Casting Titanium. O. W. Simmons, R. E. Edelman, and H. Markus. *Metal Progress,* v. 63, Mar. 1953, p. 72-74.

Process in which a casting can be made as soon as sufficient molten metal is obtained without superheating. Development of an induction furnace. (E14, Ti)

198-E. Investment Castings. They're Getting Bigger. J. R. Burns. *Product Engineering,* v. 24, Apr. 1953, p. 137-140.

Steps in the process and various types of patterns. Diagrams and photographs. (E15)

199-E. Design Tips for Changing to Die Casting. H. K. Barton. *Product Engineering,* v. 24, Apr. 1953, p. 174-178.

How specific details should be modified to meet good die-casting practice. Diagrams. (E13)

200-E. (German.) **A New Experience With Steel Molds for Pressure Casting.** H. M. Hiller. *Giesserei,* v. 40, Jan. 8, 1953, p. 16-24.

Phenomenon of cracking of steel molds for pressure casting is investigated. Causes and preventive means. Industrial experiments with brass pressure casting. Photographs. (E13, TS, Cu)

201-E. (Book.) **Conference Proceedings, Harrogate.** 100 pages. Association of Bronze and Brassfounders, 25, Bennetts Hill, Birmingham 2, England. 7s, 6d.

Complete account of proceedings of a productivity conference. Discusses manufacture of nonferrous components in brass foundry practice by means other than casting. (E general, Cu)

202-E. (Book.) **Dynasty of Ironfounders. The Darbys and Coalbrookdale.** Arthur Raistrick. Longmans Green and Company, Ltd., 6 and 7, Clifford St., London, W, England. 30s.

Development of the foundry craft from beginning of industrial revolution to the present time. (E general, A2, CI)

203-E. (Book—German) **(Handbook of Smelting and Alloying Practice in Casting of Metals.) Handbuch der Schmelz-und Legierungspraxis in der Metallgiesserei.** A. Schulenburg. 320 pages. 1952. Fachverlag Schiele & Schon, Berlin, Germany.

Reference book for apprentices and masters. Theory is kept at a minimum, and only modern types of equipment are described. Deals with heavy and light materials. (E10)

204-E. Mechanics of Foundry Mechanization and Improved Methods. R. J. Anderson. *American Foundryman,* v. 23, Apr. 1953, p. 114-120.

How reduced costs and improved quality can be obtained through mechanization and better work methods. Photographs. (E general, A5)

205-E. Effect of Sand Flowability on Casting Surface Finish. H. H. Fairfield and James McConachie. *American Foundryman,* v. 23, Apr. 1953, p. 127-132.

Results of experiments made to measure flowability of molding and core sands and to relate flowability test values to surface finish. Photographs and tables. (E18)

206-E. Mystery of Shell Molding Patterns Explained. Ray Olson. *American Foundryman,* v. 23, Apr. 1953, p. 135-139.

Use of Al patterns, treatment for

cast iron, pattern damage, ejector pin design, and method of vertical pouring. Photographs. (E16, Al, CI)

207-E. Segregation Study in Bronze Using a Radioactive Technique. W. C. Winegard. *American Foundryman,* v. 23, Apr. 1953, p. 140-141.

Results for various cooling conditions in the segregation of tin in small castings of 10% bronze. (E25, Sn, Cu)

208-E. How Gas Equipment Assures Exact Temperature for Investment Casting by Lost Wax. Arthur Q. Smith. *Industrial Gas,* v. 31, Apr. 1953, p. 3-5.

Casting pure Cu by the lost wax process. Photographs. (E15, Cu)

209-E. (German.) **Recent Cupola Furnace Construction, Especially the Hot Air Type.** Fritz Schulte. *Giesserei,* v. 40, Jan. 22, 1953, p. 45-52.

Significance of maintaining constant specific air feed, which is possible only if the cross section of the furnace remains constant. Graphs and diagrams. (E10)

210-E. (German.) **Nodular Cast-Iron Practice.** H. Gries. *Giesserei,* v. 40, Feb. 19, 1953, p. 93-103.

Reviews industrial experiences. Photographs and graphs. 17 ref. (E25, CI)

211-E. Foundry Characteristics of Aluminum and Magnesium. M. W. Martinson. *Canadian Metals,* v. 16, Apr. 1953, p. 28, 30, 32.

Preparation of molds and pouring practice. Tables. (E11, Al, Mg)

212-E. Deoxidation of Nickel and Copper Alloys. *Canadian Metals,* v. 16, Apr. 1953, p. 38.

Some of the factors involved in deoxidation. (E25, Ni, Cu)

213-E. High-Speed Counting of Steel Foundry Dust Particles. G. M. Michie. *Engineer,* v. 195, Apr. 3, 1953, p. 485-487.

Use of the "Flying-Spot" microscopic technique. (E general, A8)

214-E. Shaking Out, Cleaning, and Welding Steel Castings. John Howe Hall. *Foundry,* v. 81, Feb. 1953, p. 92-96, 251-255; Mar. 1953, p. 194-195, 284-285, 288-290; Apr. 1953, p. 96-97, 250-252, 254-256; May 1953, p. 218-220, 222, 226, 229, 232, 235.

Advantages and disadvantages of wet blasting, use of metallic shot or grit, removal of gates and risers with gas torches, removal of grinder dust, and blasting melted metal. Repair welding practice and various cleaning and finishing operations in the steel foundry. Recommendations for types of electrodes suitable for welding steel castngs and procedure to be followed in welding. Stress-relief of welded castings, effect of H_2 on welds, and a discussion of mechanical properties of welds. Photographs, diagrams, and micrographs. (E24, L10, K1, J1, CI)

215-E. Gray Iron Castings. Charles O. Burgess. *Foundry,* v. 81, May 1953. p. 118-123.

Advances including improved sand and metal technology, better cupola control, and plant modernization. Developments which seem likely to influence future. Photographs. (E11, CI)

216-E. Aluminum Castings. Floyd A. Lewis. *Foundry,* v. 81, May 1953, p. 124-129.

Development of new alloys, increased plant mechanization, and emphasis on quality control have increased use of Al castings. Photographs. (E general, Al)

217-E. Steel Castings. Charles W. Briggs. *Foundry,* v. 81, May 1953, p. 130-135.

Briefly reviews developments which have created considerable interest among steel foundrymen during the last seven years, and points out what the future may have in store. Photographs. (E11, CI)

218-E. Brass and Bronze Castings. Vaughan C. Reid and Paul G. Maganus. *Foundry,* v. 81, May 1953, p. 136-139.

Improvements in alloys and molding materials, foundry equipment, melting and molding methods have contributed to more efficient production of higher quality castings in Cu-base alloys. Photographs. (E11, Cu)

219-E. Malleable Iron Castings. James H. Lansing. *Foundry,* v. 81, May 1953, p. 140-145.

Research activities in ways to improve and standardize malleable foundry operations include work on core practices; gating and feeding methods; and study of the effect of various atmospheres on melting and annealing. Photographs. (E11, CI)

220-E. Magnesium Castings. T. E. Leontis and H. E. Elliott. *Foundry,* v. 81, May 1953, p. 146-149.

Availability of new alloys, adoption of new core binders, perfection of gating techniques, and improvements in grain refinement have helped apply Mg castings to aircraft needs. (E11, Mg)

221-E. A Modern Stove Foundry. A. R. Parkes. *Foundry Trade Jour-*

nal, v. 94, Apr. 2, 1953, p. 377-383.
Layout and working methods of foundry equipped specifically for the production of stove-grate castings. Photographs. (E11)

222-E. Production of Sound Castings by Controlled Rate of Heat Transfer. C. A. Parlanti. *Institution of Engineers & Shipbuilders in Scotland, Transactions,* v. 96, Part 5, 1952-53, p. 246-259; disc., p. 259-260.
Metal cast in a chilled mold has better physical properties than that in an ordinary mold. Use of Al molds to control rate of heat transfer throughout the casting. Photographs. (E25, Al)

223-E. Thor Resins for the Production of Shell Moulds and Cores. *Machinery* (London), v. 82, Apr. 10, 1953, p. 687-689.
Mold assembly; runner and gating arrangements; precautions; and advantages of the process. (E16)

224-E. Founding High-Tensile Brasses and Bronzes. Part I. Introduction. Part II. Running Technique. Part III. Liquid Shrinkage. Part IV. Feeding. Part V. Patterns and Moulding. Part VI. Furnaces. Part VII. Melting. Part VIII. Moulding Technique. G. W. Reid. *Metal Industry,* v. 82, Feb. 13, 1953, p. 121-123; Feb. 20, 1953, p. 145-147, 151; Feb. 27, 1953, p. 161-163, 170; Mar. 6, 1953, p. 185-187; Mar. 13, 1953, p. 209-211; Mar. 20, 1953, p. 229-231; Mar. 27, 1953, p. 249-251; Apr. 10, 1953, p. 281-284.
Problems associated with founding of Mn and Al bronzes. Written for those with little or no experience who may be required to make castings. Tables and diagrams. (E11, Cu)

225-E. (German.) **Further Examples for Forming Blowholes.** F. Roll. *Giesserei,* v. 40, Jan. 22, 1953, p. 53-54.
Examples of blowholes in various cast irons. Economic means of elimination. (E25, CI)

226-E. Investment Castings. *Electrical Manufacturing,* v. 51, May 1953, p. 93, 96-97.
Fundamental design rules. Typical applications of the process. (E15)

227-E. Better Parts Flow Trims Foundry Costs. Herbert Chase. *Iron Age,* v. 171, Apr. 30, 1953, p. 97-101.
Continuous parts flow and improved layout of machinery in casting cleaning plant which increased cleaning efficiency and reduced cleaning costs. Photographs. (E general, L10, L12, CI)

228-E. Press Dies Cast From Plaster Forms. Howard Cope and Harvey Landis. *Machinery* (American), v. 59, Apr. 1953, p. 190-191.
Formation of the dies. Photographs. (E16, SG-j)

229-E. Considerations for Successful Use of Investment-Cast Type 410. Davidlee Von Ludwig. *Metal Progress,* v. 63, Apr. 1953, p. 84-87.
Surface pitting which often occurs when Types 410 and 416 stainless steels are cast. Mechanical tests and metallographic studies using Types 410, 420, 440, 302, 303, and 394. Suggests need for future study. (E15, Q general, M27, SS)

230-E. Correct Impregnation of Castings Prevents Leakage, Internal Corrosion, and Spotted or Blistered Finishes. Wilson N. Pratt. *Metal Progress,* v. 63, Apr. 1953, p. 88-92.
Impregnation of castings by internal, external, and batch-type vacuum pressures. Compares impregnating materials and their properties. Benefits of proper impregnation. Photographs. (E25)

231-E. Sonnets for the Metallurgist. R. P. Lister. *Metal Progress,* v. 63, Apr. 1953, p. 110-112.
Trials and tribulations which Benvenuto Cellini encountered when casting his "Perseus". (E15, Cu)

232-E. Graphite Molds Turn Out Steel Wheels of Uniform Structure. *Railway Locomotives and Cars,* v. 127, May 1953, p. 61-65.
Advantages and design of the wheel. The graphite mold, pouring, and tests. Photographs. (E11, CI)

233-E. Plaster Casts for Pressure-Cast Matchplates. *Canadian Metals,* v. 16, May 1953, p. 28-30.
By using plaster as the mold material only one master pattern is required for any number of reproductions in the plate. High degree of accuracy is maintained and ultimate costs can be reduced. (E16, Al)

234-E. Foundry Characteristics of Aluminum and Magnesium. M. W. Martinson. *Canadian Metals,* v. 16, May 1953, p. 32-34.
Summary of the defects that may be encountered in making castings. (E general, Al, Mg)

235-E. The Cothias Process. E. N. Field. *Machinery,* (London), v. 82, Apr. 24, 1953, p. 779-781.
Method, applications, advantages, and disadvantages of a die-casting process. Diagrams. (E13)

236-E. Method of Registering, Clamping, Closing-Up and Supporting Shell Moulds. A. S. Beech. *Machinery*

(London), v. 82, Apr. 24, 1953, p. 784-786.

Method and advantages. Photographs. (E16)

237-E. Quality in Light Metal Castings. *Metal Industry,* v. 82, May 1, 1953, p. 359-360.

Benefits derived from standardization. (E general, S22, Al, Mg)

238-E. Die Castings in Trico-Folberth Products. *Metal Industry,* v. 82, May 1, 1953, p. 361-364.

Ways in which pressure die casting has influenced design, simplified assembly, and eliminated operations. Examples are given of automobile accessories using Al and Zn alloys. Photographs. (E13, T21, Al, Zn)

239-E. (French.) Improvements From Synthetic Resin-Based Agglomerants. G. L. Harbach and P. G. Pentz. *Fonderie,* no. 86, Mar. 1953, p. 3331-3343.

Use of rejuvinated sand mixtures. Tables, photographs, graphs, diagrams. 5 ref. (E18)

240-E. (French.) Study of a Light Alloy Casting Subjected to Static and Dynamic Tests. Louis Grand. *Fonderie,* no. 86, Mar. 1953, p. 3344-3350.

The casting of tubes in sand and improvement of fatigue resistance and machanical characteristics of cast pieces. Photographs, tables, diagrams. (E11, Q general, Al)

241-E. (French.) Characteristics of Aluminum Alloys Rich in Magnesium. *Fonderie,* no. 86, Mar. 1953, p. 3357-3360.

Discusses the alloys A-G3T-Y, A-C6-Y, 2A-5GL-Y, and especially A-G4Z. Tables. (E25, Q general, Al, Mg)

242-E. Dry Reclamation of Molding Sand Lowers Cost of Steel Castings. James A. Cannon. *American Foundryman,* v. 23, May 1953, p. 68-73.

Advantages of using reclaimed sand for facing mixes. Study of casting defects and quality indicates reclaimed sand is comparable to new sand. Diagrams, graphs. (E18, CI)

243-E. Research in Pattern Coating Produces Quality Castings. Charles J. Berg. *American Foundryman,* v. 23, May 1953, p. 80-86.

Types of coatings commonly used. Data comparing the package, application, and dry film characteristics of shellac, crankcase sealer and seven other pattern coatings. Shortcomings and virtues of different coatings. Cost factors and the inherent economies of higher solids coatings. Application techniques and shop conditions. Several suggestions concerning these problems. Photographs. (E17)

244-E. Hot Boxes Bake Cores Without Use of Driers. W. M. Peterson. *American Foundryman,* v. 23, May 1953, p. 87-89.

Development of system for making and baking cores in one operation. Photographs. (E21)

245-E. Melting Iron in the Reverberatory Furnace. J. G. Winger and H. E. Simmons. *American Foundryman,* v. 23, May 1953, p. 94-99.

Aspects of the furnace with respect to fuel, maintenance, refractories, melting, and advantages. Graphs, photographs, tables. (E10, CI)

246-E. An Automatic Apparatus for Recording Evolution of Gas From Foundry Cores. G. V. Cullen. *Australian Journal of Applied Science,* v. 4, Mar. 1953, p. 58-64.

Apparatus which records rate at which gas is evolved when a foundry sand core is heated at constant pressure in an inert atmosphere. Photographs, diagrams. (E21)

247-E. Economies in the Use of Moulding Materials. W. B. Parkes. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Apr. 1953, p. 525-530; disc., p. 530-533.

Methods for avoiding waste of molding materials. (E19)

248-E. Developments in Steel Castings in the Heavy Power Plant Industry. F. Buckley. *Foundry Trade Journal,* v. 94, Apr. 9, 1953, p. 405-411; Apr. 16, 1953, p. 439-444.

Developments in the science of foundry production and practice. Steel casting problems encountered in the manufacture of heavy prime-movers and power generators. Trends in application of castings within the heavy engineering industry. Photographs. (E11, T25, CI)

249-E. Interchangeable Cores in Die-Casting. H. K. Barton. *Metal Industry,* v. 82, Apr. 24, 1953, p. 321-322.

Shows that the use of interchangeable cores is a valuable expedient in many types of die casting. Diagrams. (E13)

250-E. Propeller Blade Blemishes. *Metal Industry,* v. 82, Apr. 24, 1953, p. 330.

Shows that surface defects which appear during polishing, and often give considerable trouble, have their origin much earlier in the history of the casting. Photographs. (E25, Cu)

251-E. Castings for Measuring Instruments. *Metallurgia,* v. 47, Apr. 1953, p. 206-208.

Metal melting; sand plant and molding equipment; and core shop of foundry for instrument manufacture. Photographs. (E11, T8, Cu, Al)

252-E. (French.) **Influence of Boron on the Properties of Black-Heart Malleable Cast Iron.** Georges Martin. *Fonderie,* no. 84, Jan. 1953, p. 3265-3280.

Influence of B in the absence of Cr for determining the action on graphitization annealing and mechanical properties. Tables, micrographs. (E25, Q general, B, CI)

253-E. (French.) **Relationship Between Drying Time and Thickness of a Core.** Maurice DeCrop. *Fonderie,* no. 84, Jan. 1953, p. 3281-3285.

Experimental data on a series of cores of increasing thickness. Presents a curve demonstrating baking time as a function of thickness. Graphs. (E21)

254-E. (French.) **Mechanism of Stripping.** Gabriel Chauvin. *Fonderie,* no. 85, Feb. 1953, p. 3295-3306.

Compares techniques used in French foundries with practices used in other countries. (E24)

255-E. (French.) **Cracks or Fissures in Stove Castings.** Pierre Nicolas. *Fonderie,* no. 85, Feb. 1953, p. 3313-3316.

Origin of fissures and ways of avoiding them in sand or earthen molds. Micrographs. (E25)

256-E. (French.) **Self-Cleaning Twin Tuyeres.** *Fonderie,* no. 85, Feb. 1953, p. 3317-3321.

Operating principle, installation, utilization, and different types. Diagrams. (E10)

257-E. (German.) **Bouard's Equilibrium in the Cupola and the Influence of Stack Height.** Wolfgang Von Preen. *Giesserei,* v. 40, no. 6, Mar. 19, 1953, p. 141-144.

Bouard's equilibrium fixes the laws of formation of furnace gas by disregarding air dampness. Temperature at which reaction stops is used as reaction temperature in the equilibrium state. (E10)

258-E. (German.) **Prerequisites for Production of Spherical Graphite Cast Iron, Its Properties and Uses.** Karl Löhberg. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 212-218.

Addition of Mg to the melt and its relationship to the S content. (E25, CI)

259-E. (German.) **Industrial and Economic Basis of Nonferrous, Heavy Metal, Compound Casting.** G. Schwietzke. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 8-17.

Process for preparing compound castings of Cu alloys and steel. Diagrams. (E16, Cu, CI)

260-E. Fuel and Metal. R. J. Sarjant. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A24-A33.

Part played by fuel in practical and scientific foundry practice. Graphs, diagrams. 33 ref. (E general, B18).

261-E. Flow of Metal. E. M. Curie, chairman. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A48-A55; disc., p. A55-A56.

Serves as a narrative to accompany a film showing flow patterns of metals entering molds. Photographs. (E25)

262-E. Probable Trends in British Steelfoundry Practice. F. Cousans. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A110-A113; disc., p. A121-A125.

Considers steelmaking, melting, sand practice, molding, coremaking, "C" process, cleaning, materials handling, production control, training programs, and foundry methods. (E general, CI)

263-E. Gas Removal From Molten Aluminium Alloys. A. W. Brace. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A138-A146; disc., p. A146-A148.

Survey of gas absorption and removal, including sources of H_2, mechanism of absorption, factors affecting the amount of porosity and its distribution, and conditions for the removal of gas from the melt. Consideration is given to the application of this knowledge for the production of castings under normal foundry conditions. Effects of Cl and volatile chlorides on the soundness of castings. Micrographs, graphs. (E25, Al)

264-E. Grain Refinement of Non-Ferrous Castings. G. Swinyard. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A149-A154; disc., p. A154-A156.

Grain refinement of Al, Mg, and Cu alloys. Micrographs, diagrams. 19 ref. (E25, Al, Mg, Cu)

265-E. Research on Atmospheric Dust in Steel Foundries With Special Reference to the Use of Statistical Surveys. G. M. Michie and G. H. Jowett. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. A190-A200; disc., p. A200-A204.

Use and interpretation of atmos-

pheric dust surveys. Reference is made to dust sampling and estimation, and to potential importance of automatic methods. Data from two environmental dust surveys in steel foundries are discussed. Statistical considerations involved in design and analysis of such surveys are considered. Tables, graphs.
(E general, A5, A7)

266-E. Experiences With the Investment Casting Process. D. F. B. Tedds. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B1-B14.

Possibilities and limitations of the process. Gives examples of special components for which it has been adapted on an experimental basis. Various features of investment casting are analyzed and the present position and future development are treated. Diagrams, tables, photographs. (E15)

267-E. Cross-Section of a Non-Ferrous Jobbing Foundry. J. Gorman. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B15-B28.

Pump castings, semirepetition, and architectural casting. Photographs.
(E general, EG-a)

268-E. Castings to Resist Abrasive Wear. E. J. Brown. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B29-B37.

How Mn-steel as well as alloy cast irons and other alloy steels were developed to meet service conditions. Gives manufacturing methods and applications for these materials. Flame hardening, nitriding, and surface deposits of abrasion resisting material are considered. Photographs, micrographs, diagrams, graphs.
(E general, J2, J28, Q9, AY, CI)

269-E. Process Planning in the Steel Foundry. S. L. Finch. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B38-B47.

Means to achieve high-quality, greater productivity from men and materials, and to do this repetitively on an economic basis. Photographs, diagrams. (E general, A6, ST)

270-E. Recent Development of Cupola Design With Special Reference to Hot-Blast. Fritz Schulte. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B48-B58; disc., p. B59-B62.

Considers similarity to blast furnace, performance figures, lining profile, heat lost to cooling water, thin linings, preheated air, limiting factors, types of recuperators, modified cupola design, melting with O_2 addition, and induction heating addition. Graphs, diagrams. (E10)

271-E. Castings for the Corliss Steam Engine. D. Redfern. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B63-B73.

Casting half flywheels, trunk guide soleplates, and steam cylinders. Extensive photographs. (E general, CI)

272-E. Chemical Chilling and Feeding. J. E. R. Tompkin. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B74-B76; disc., p. B76-B77.

Compares orthodox chilling, Te chilling, feeding, and exothermic feeding. Diagrams. (E23, E25)

273-E. Castings for a Small Diesel Engine. H. J. M. Conacher. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B78-B86.

How a company producing whiteheart malleable castings undertook production of high-duty gray-iron castings for a small diesel engine. Photographs. (E general, T25, CI)

274-E. Production of Castings in Aluminium-Bronze, D.T.D. 412. L. Hargreaves. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B108-B110.

Melting, pouring, casting, feeding, and chills. Photographs.
(E11, Al, Cu)

275-E. Foundries in the French Ardennes. A. R. Parkes. *Institute of British Foundrymen. Proceedings,* v. 45, 1952, p. B111-B120; disc., p. B120-B124.

Five French foundries as observed by a British team. Photographs.
(E general)

276-E. Production Aids in the Steel Foundry. G. D. McNair. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B134-B137.

Improved casting technique which was found to increase production. Diagrams. (E general, CI)

277-E. Ways and Means to Increased Productivity. John Hunter. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B138-B143.

General factors affecting productivity in the foundry. Lists and examines in detail major influences and means for improvement. Patterns, molding, boxes, manual effort, roller-track, overhead hoppers, "Sandslingers", and rubbish disposal are dealt with. Diagrams.
(E general, A8)

278-E. (Book.) **Cast Bronze.** Harold J. Roast. 458 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $4.00.

Describes a theoretical bronze foundry; foundry layout; purchase

and handling of metal; fuels and furnaces, melting and sand; making castings, cores, and dry sand molds; inner life and activity of metals; chemical and physical testing; and various types of bronzes.
(E general, Cu)

279-E. (Book.) **Institute of British Foundrymen, Proceedings, (Annual Volume),** v. 45, 377 p. 1952. Institute of British Foundrymen, Saint John St. Chambers, Deansgate, Manchester 3, England.

Contains 33 papers which have been abstracted separately.
(E general)

280-E. (Book—German.) **(Molding and Pouring.) Das Formen und Giessen.** Adolf Fischer. 178 pages. 1951. B. G. Teubner Verlagsgesellschaft, Leipzig, Germany.

Various molding and casting processes. Practical applications in brief and concise form. (E19, E23)

281-E. Effects of Melting Furnace Atmosphere on Casting Properties and Annealability of Malleable Iron. E. A. Lange and R. W. Heine. American Foundrymen's Society, Preprint 53-4, 1953, 23 p.

Influence of furnace gases on chemistry, mottling, fluidity, hot tearing, annealability, and as-cast microstructure. (E10, J23, M27, CI)

282-E. Induced Flow Process of Baking Oil-Bonded Cores. C. T. Marek and R. J. Wimmert. American Foundrymen's Society, Preprint 53-9, 1953, 11 p.

Study of transformations taking place in conventional core production. Tables, graphs.
(E21, N general)

283-E. A General Look at Non-Ferrous Molding Sands. C. A. Robeck and C. A. Sanders. American Foundrymen's Society, Preprint 53-11, 1953, 7 p.

Advantages in using natural sands; presents some formulas.
(E18, Cu, Al)

284-E. Agar Gels in Plaster-Bonded Investment. H. Rosenthal and S. Lipson. American Foundrymen's Society, Preprint 53-13, 1953, 3 p.

Shows that addition of agar to mixes was effective when used as a dipping precoat and as a single investment. (E15)

285-E. Feeding Range of Joined Sections. E. T. Myskowski, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-14, 1953, 7 p.

Experimental data in which casting soundness was evaluated by radiography of longitudinal strips. Tables, diagrams, graphs.
(E23, S13, CI)

286-E. Conveyor Molding Standards. Everett C. Reid. American Foundrymen's Society, Preprint 53-16, 1953, 9 p.

Method of developing time standards for mechanized molding lines.
(E19)

287-E. Factors Involved in Making a Sand Mixture. Preliminary Study No. 1. D. F. Baker and D. C. Williams. American Foundrymen's Society, Preprint 53-18, 1953, 6 p.

Preparation of foundry sand mixtures which are evaluated in terms of their mechanical properties.
(E18, Q general)

288-E. Solidification of Cylinders. V. Paschkis. American Foundrymen's Society, Preprint 53-19, 1953, 7 p.

Experimental data on long and short cylinders. Graphs, tables.
(E25, CI)

289-E. Report of A.F.S. Flowability Committee. J. B. Caine. American Foundrymen's Society, Preprint 53-24, 1953, 3 p.

Latest findings pertaining to testing of core materials. (E18, E21)

290-E. Trends for the Relation of Chill Test Depth and Carbon Equivalent of Gray Cast Irons. E. A. Loria. American Foundrymen's Society, Preprint 53-28, 1953, 4 p.

Tests obtained from two automotive foundries employing different cupola melting practices. Graphs.
(E25, CI)

291-E. Developing Standard Data Tables for Core Finishing. L. L. Martin. American Foundrymen's Society, Preprint 53-29, 1953, 12 p.

Development of data tables for medium and heavy cores ranging from 15 to 1500 lb. in weight. (E21)

292-E. Resins and Sands for Shell Molding. Manuel F. Drumm. American Foundrymen's Society, Preprint 53-30, 1953, 11 p.

Various properties of resins and sands. (E18, E19)

293-E. Deformation of Green Molding Sand. W. G. Parker. American Foundrymen's Society, Preprint 53-32, 1953, 6 p.

Test data in tabulated form. (E18)

294-E. Velocities and Volume Rates of Metal Flow in Gating Systems. W. H. Johnson, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-33, 1953, 11 p.

Quantitative studies of effects of various gating systems on flow characteristics during first stage pouring. (E22, E23)

295-E. Casting Magnesium Alloys in Shell Molds. Nicholas Sheptak. American Foundrymen's Society, Preprint 53-36, 1953, 7 p.

Successful production of Mg shell-mold castings when inhibitors were used as addition agents or mold washes. (E16, Mg)

296-E. Veining Tendencies of Cores. A Progress Report by A.F.S. Sand Division Committee 8-J. American Foundrymen's Society, Preprint 53-37, 1953, 5 p.

Relationship between hot strength, hot deformation, and veining tendencies of cores. Tables. (E21, E18, CI)

297-E. Ramming of Molding Sands. Harry W. Dietert and Alex L. Graham. American Foundrymen's Society, Preprint 53-39, 1953, 11 p.

Test on the effect of squeeze ramming properties on the physical properties of four production molding sands. Tables, graphs. (E18)

298-E. Solidification at Corner and Core Positions. F. A. Brandt, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-41, 1953, 7 p.

Effects of core and wall thicknesses on solidification rates of cast steel. (E25, CI)

299-E. Use of Standards in Controlling Costs. Wm. Busby. American Foundrymen's Society, Preprint 53-44, 1953, 9 p.

Cost reduction potential made possible by use of standards in the foundry industry. Tables. (E general, S22, A4)

300-E. Correlation of Air Furnace Bottom Temperature to Refractory and Operating Practice in a Cupola-Air Furnace Duplex System. F. W. Jacobs and J. S. Lawrence, Jr. American Foundrymen's Society, Preprint 53-45, 1953, 10 p.

Experimental data; method of furnace construction. Schematic diagram, graphs, tables. (E10)

301-E. Some Factors Affecting Spherical-Type Macro-Gas Porosity in 85-5-5-5 Bronze. R. B. Fischer. American Foundrymen's Society, Preprint 53-46, 1953, 20 p.

Experimental procedure in which observations were made on a specially designed casting. Effects of mold materials, binders, coatings, melting methods, degassification, and deoxidation were studied. Results were photographed. (E25, Cu)

302-E. Magnesium Alloy Permanent Mold and Semi-Permanent Mold Castings. M. E. Gantz, Jr., E. M. Gingerich, and R. T. Woods. American Foundrymen's Society, Preprint 53-49, 1953, 8 p.

Current status of the art of casting Mg. (E12, Mg)

303-E. Evaluation of Mold Materials for Titanium Castings. R. M. Lang, J. G. Kura, and J. H. Jackson. American Foundrymen's Society, Preprint 53-52, 1953. 5 p.

Mold development program for making high-purity Ti castings; describes gas-atmosphere induction furnace. (E18, Ti)

304-E. Progress Made in Fluidity Testing of Molten Metals During the Last Ten Years. A. I. Krynitsky. American Foundrymen's Society, Preprint 53-51, 1953, 12 p.

Commonly used methods. Schematic diagrams. (E25, Al)

305-E. Laying Out a Mechanized Shell Molding Foundry. Ray Olson. *Foundry,* v. 81, June 1953, p. 108-112.

Describes layout and equipment installed. Photographs. (E16)

306-E. Rapid Advances Made in Casting Light-Metal Alloys. John Howe Hall. *Foundry,* v. 81, June 1953, p. 114-117, 281-283.

Casting techniques for Al alloys 355, 356, 220, 142, 132, 195, 108, WAD 6344 (new), and Mg alloys AZ-91, AZ-92, AZ-63, ZRE-1, ZT-1, and Z5Z. Photographs. (E general, Al, Mg)

307-E. New Coreroom Handles Jobbing Work Efficiently. John E. Wolf. *Foundry,* v. 81, June 1953, p. 118-119, 221.

Simple and efficient coreroom which reduces costs, increases production, and improves quality of cores. Photographs. (E21)

308-E. Internal Porosity and Inverse Segregation in White Cast Iron. W. B. Sobers. *Foundry,* v. 81, June 1953, p. 128-131, 284-288.

Behavior of solidifying metals which results in internal shrinkage. Discusses forces which are active during solidification and which should be balanced in the attempt to produce sound castings. Micrographs, graphs. (E25, CI)

309-E. New Brake Shoe Foundry Operating in California. *Foundry,* v. 81, June 1953, p. 132-133.

New factory and its equipment. Photographs. (E11)

310-E. How to Eliminate Some Machining on Castings. H. L. Smith. *Foundry,* v. 81, June 1953, p. 215, 217, 220.

Several methods of eliminating certain drilling and tapping operations, together with a method for casting difficult lugs or projections without machining. (E general, G17, CI)

311-E. Economical Use of Metals in the Foundry. D. W. Hammond. *Foundry Trade Journal,* v. 94, Apr. 16, 1953, p. 433-438; Apr. 23, 1953, p. 475-478; disc., p. 479.

Methods for better utilization of raw materials in the foundry, and conversion of swarf and borings into useful metal. Diagrams, photographs, tables.
(E general, A8, CI, ST)

312-E. Castings for the Smithy and Forge. W. S. Spenceley. *Foundry Trade Journal,* v. 94, Apr. 23, 1953, p. 467-473; Apr. 30, 1953, p. 503-506.

Castings for power hammers and friction drop-hammers, and their mode of functioning. Chilling or heat absorption methods are contrasted with pressure feeding. Mold-assembly methods. Control methods. Photographs. (E11, T5, CI)

313-E. Quality in Light-Metal Castings. *Foundry Trade Journal,* v. 94, Apr. 23, 1953, p. 474, 480.

Shows that the light metal industry is likely to be retarded if short-sighted methods of development are adopted. Standards of quality and service.
(E general, S22, Al)

314-E. New Foundry for Heavy Non-Ferrous Castings. A. R. Parkes. *Foundry Trade Journal,* v. 94, Apr. 30, 1953, p. 489-494.

Foundry layout and design. Photographs. (E general)

315-E. Design, Installation and Operation of a Water-Cooled Cupola. J. W. Dews. *Foundry Trade Journal,* v. 94. May 7, 1953, p. 519-522; May 14, 1953, p. 561-564; disc., p. 564-565.

Situation existing at the foundry before water-cooling of cupolas was in use; reasons for its adoption. Operating details and economics of applying water-cooling segments to cupolas running for 8-hr. melts. Empirical equations for the heat balance are included. Diagrams. (E10)

316-E. Steel Castings and Their Application. Frank Rowe. *Foundry Trade Journal,* v. 94, May 7, 1953, p. 525-527.

Factors which make steel a difficult material to cast. Various improvements and recent progress are included. Tables. (E general, CI)

317-E. Tunnel-Type Continuous Core Stove. *Foundry Trade Journal,* v. 94, May 14, 1953, p. 559-560.

Design and operation of a gas-fired, tunnel-type, continuous unit. (E21)

318-E. Reverberatory Furnace for the Small Foundry. *Machinery Lloyd* (Overseas Ed.), v. 25, May 9, 1953, p. 111-112.

Advantages, firing, charging, output, and melting data. (E10, C21)

319-E. What the Purchasing Agent Should Know About Buying Die Castings. F. G. Krach. *Precision Metal Molding,* v. 10, Sept. 1952, p. 32-34, 80-81.

Factors to be considered. (E13)

320-E. Investment Cast Gears and Cams in Custom-Built Machines. *Precision Metal Molding,* v. 10, Sept. 1952, p. 36-38.

Features of the process. Considers cycling of operations. Photographs. (E15, Cu, CI)

321-E. Weak, Assembled Components Replaced by One-Piece Die Castings. G. L. Oman. *Precision Metal Molding,* v. 10, Nov. 1952, p. 23, 54.

Castings for coupling pistons. Photographs. (E13)

322-E. How Frozen Mercury Patterns Are Used to Produce Investment Castings. *Precision Metal Molding,* v. 10, Nov. 1952, p. 24-26.

Photographs illustrate process. (E15)

323-E. Die Castings and Sinterings. A Useful Combination for Appliances. O. E. Lackner. *Precision Metal Molding,* v. 10, Nov. 1952, p. 28-29.

Points out accuracy which is obtainable. (E13, H15)

324-E. Permanent Mold Castings in Zinc Where Quantities Are Limited. L. Peters. *Precision Metal Molding,* v. 10, Nov. 1952, p. 32, 58-59.

Castings for manufacture of automobile horns. (E12, Zn)

325-E. Rubber and Leather Can Be Bonded to Die Castings for Oil Seals. *Precision Metal Molding,* v. 11, Jan. 1953, p. 25, 77-78.

Technique. (E13, K11, Zn)

326-E. Machined? Brazed? Forged? or Investment Cast? *Precision Metal Molding,* v. 11, Jan. 1953, p. 36-37.

Problems associated with production of an irregular-shaped flyball. Solution is investment casting in AISI E52100 steel. (E15, AY)

327-E. Pressure-Tight Die Castings Used in Moisture Injector. Lavern Berg. *Precision Metal Molding,* v. 11, Jan. 1953, p. 38, 62-63.

Construction of a vacuum tight, "Hydro-Power Injector". (E13)

328-E. Here's How the "Unit Strip" System Aids the Designer and Buyer of Plaster Mold Castings. *Precision Metal Molding,* v. 11, Jan. 1953, p. 40-41.

How it is possible to make several thousand parts from a single pattern at only a slight difference in unit cost. (E16, E17)

329-E. What Future for Plated Aluminum Die Castings? *Precision Metal Molding,* v. 11, Jan. 1953, p. 43-44.

Applications of Cr-plated Al castings. (E13, L17, Al, Cr)

330-E. High Cost of Machine Tools Avoided by Investment Castings. *Precision Metal Molding,* v. 11, Feb. 1953, p. 31.

Description. (E15)

331-E. Permanent Mold Castings in Hand-Held, Book Molds for Low-Temperature Alloys. *Precision Metal Molding,* v. 11, Feb. 1953, p. 35, 84-85.

Describes techniques using a variable alloy composition (trade secret). (E12, SG-d)

332-E. How to Get the Most From the Die Casting Process. Martin B. Brandt. *Precision Metal Molding,* v. 11, Feb. 1953, p. 40, 80-83.

Describes a redesign which utilized Al castings in production of master lighting switch for automotive use. (E13, T21, Al)

333-E. Substitution of Plaster Molds for Sand Gives Accurate, Low-Cost Castings. *Precision Metal Molding,* v. 11, Feb. 1953, p. 46-47.

Use of gypsum casting plaster for nonferrous alloys. (E16, EG-a)

334-E. Methods of Lubricating Moving Parts of Die Casting Dies. W. M. Halliday. *Precision Metal Molding,* v. 11, Feb. 1953, p. 86-98.

Main lubricating problems and possible solutions. Diagrams. (E13, A5)

335-E. Die Castings vs. Stampings for Large, Thin Pieces. *Precision Metal Molding,* v. 11, Mar. 1953, p. 31-32.

Die-casting steel and Al parts. Photographs. (E13, Al, ST)

336-E. Die Casting. Answer for Short Run of a Special Shape. *Precision Metal Molding,* v. 11, Mar. 1953, p. 38-39, 58-59.

Advantages of die casting cams. Photographs. (E13, CI)

337-E. Die Cast Zinc for Stability and Strength. Charles B. Lee. *Precision Metal Molding,* v. 11, Mar. 1953, p. 46, 78.

Use of Zn die-cast end bells for small electric mixers. (E13, T10, Zn)

338-E. Two-Piece Patterns Used for Heat-Resistant Investment Castings. D. C. Scheele. *Precision Metal Molding,* v. 11, Mar. 1953, p. 49-50.

Production of infra-red radiant gas burners from 35-15 Ni-Cr alloy. Principle of burner operation, construction, and investment vs. sand casting. Photographs. (E15, E11, Ni)

339-E. Pattern Dies for Investment Casting. S. Lipson and H. Rosenthal. *Precision Metal Molding,* v. 11, Mar. 1953, p. 82-97; Apr. 1953, p. 115-116, 121-122, 125-126.

Pattern die types, factors affecting die design, fundamental considerations, shrinkage allowance, casting, pressing, centrifuging, and machined dies. Diagrams. (E15, E17)

340-E. Small Iron Sand Castings Can Be Converted to the Precision Metal Molding Processes. *Precision Metal Molding,* v. 11, Apr. 1953, p. 29-33.

Results of survey to determine how many duplicate parts are used per year, who buys them, and how much machining adds to the piece cost. Photographs, tables. (E11, E13, E15, CI)

341-E. The Antioch Process for Extra-Large Aluminum Castings With Close Dimensional Control. *Precision Metal Molding,* v. 11, Apr. 1953, p. 44-45, 132-134.

Casting size, surface finish, dimensional accuracy, metallurgical quality, and intricacy of castings. Photographs. (E16, Al)

342-E. Die Cast Housings Have Many Advantages. E. Erdman. *Precision Metal Molding,* v. 11, Apr. 1953, p. 46-47.

(E13, Zn, Al)

343-E. The Place of Shell Molding as a Precision Casting Method. R. A. Kempe. *Precision Metal Molding,* v. 11, May 1953, p. 30-31, 71-73.

Advantages of the process. Photographs. (E16)

344-E. Aluminum Die Casting Replaces Laminated Plastic-Bonded Paper. *Precision Metal Molding,* v. 11, May 1953, p. 40, 73.

An Al mold for replacing rubber insulation on a spliced wire. (E13, T1, Al)

345-E. Limitations of Investment Cast Tool Alloys. Davidlee Von Ludwig. *Tool Engineer,* v. 30, June 1953, p. 51-55.

How segregation, grain size and mechanical properties affect success. Experiments using SAE Type 52100 steel. Micrographs. (E15, Q general, M27, SS)

346-E. (French.) **Influence of Foundry Blacks on Castings. The Noirfran Brand.** Pierre Nicolas. *Fonderie,* no. 86, Mar. 1953, p. 3351-3356.

Use of ground bituminous coal in foundry sands to promote smoother surfaces. Diagrams, tables. (E18, CI)

347-E. (German.) **Casting of Individually Cast Piston Rings.** C. Englisch. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 1, Jan. 1953, p. 8-12.

Compares procedures for producing piston rings from individual castings and from centrifugally cast cylinders. Photographs, graphs. (E14, CI)

348-E. (German.) **Physico-Chemico Basis of Cast Steel Foundry Practice.** W. Trommer. *Giesserei,* v. 40, no. 3, Feb. 5, 1953, p. 69-75.
Fundamentals which govern the flow of molten steel. Graphs, diagrams, tables. (E23, CI)

349-E. Shell Molding's Outstanding Opportunities for Foundry Advancement. James H. Smith. *Automotive Industries,* v. 108, June 1, 1953, p. 68-69, 112.
Molding technique which produces a very smooth and accurate casting and utilizes pressures up to 500 psi. Cost and possible mechanization of the molding operation. Photographs. (E16)

350-E. Conveying Foundry Sands Pneumatically. C. J. Converse. *Canadian Metals,* v. 16, May 20, 1953, p. 30, 32.
Method of transporting conditioned foundry sands pneumatically through steel pipes to molders and coremakers. Performances of actual installations are quoted and the sand system in a typical foundry installation is described. (E18)

351-E. Wet Method for Sand Reclamation. C. E. Maddick. *Canadian Metals,* v. 16, May 20, 1953, p. 34, 37-38.
Operation of a wet type sand reclaimer installed in a large mechanized foundry. Installation has successfully answered major problems of maintaining quality with economy. Performance of the reclaimed sand. (E11, A8)

352-E. Fluidity Test for Quality Control in the Foundry. T. P. Yao. *Foundry Trade Journal,* v. 94, May 21, 1953, p. 573-577.
A miniature special test which provides a simple means of determining fluidity of liquid metal. Graphs, diagrams. (E25)

353-E. Proving Tests and Procedures for New Dies. W. M. Halliday. *Foundry Trade Journal,* v. 94, May 21, 1953, p. 579-581.
Precision, shape, strength, and finish of die casting dies. (E13, T5)

354-E. A Malleable Cast Ferrous Alloy With Good Hardening and Welding Properties. *Machinery* (London), v. 82, June 12, 1953, p. 1106-1108.
Technique for casting a new ferrous alloy. Composition and properties. Graphs.
(E11, Q general, P general, CI)

355-E. (German.) **Alloying and Foundry Practice as Related to Bronze.** E. Thews. *Giesserei,* v. 40, no. 7, Apr. 2, 1953, p. 168-170.
Foundry properties of Pb-containing bronze. Emphasizes variation by alloying and thermal factors; NiS and Fe contents; gas content; smelting and casting temperatures; additions of scrap and residues; and use of P as deoxidizing or alloying component. Tables. 17 ref.
(E general, Cu)

356-E. (German.) **Compressed-Air Piping and Requirements of a Converted Foundry.** R. Brinkmann, W. Wolfer, and W. Gesell. *Giesserei,* v. 40, no. 7, Apr. 2, 1953, p. 171-174.
Examines air requirements for mechanization from standpoint of the molding machines, exhaust vents, sandblasting equipment, and stampers. Influences of conductance distance and cross section are computed for leakage and pressure. Graphs. 14 ref. (E19)

357-E. (German.) **Precautions in Cupola Furnace Dumping.** *Giesserei,* v. 40, no. 7, Apr. 2, 1953, p. 179-180.
Functioning of the pneumatic hopper. Diagrams. (E10)

358-E. (German.) **West German Cast-Metal Production in 1952.** Günther Hücking. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 292.
General discussion. Tables.
(E general, A4)

359-E. Runners and Risers for Steel Castings. E. Daybell. *Foundry Trade Journal,* v. 94, May 28, 1953, p. 601-609.
Typical methods. Various set-ups. Photographs and diagrams.
(E22, CI)

360-E. Predicting Casting Costs. Philip Tripoli. *Machine Design,* v. 25, June 1953, p. 139-154.
Scientific approach, based on statistical analysis of actual parts, for accurate determination of casting costs at early design stages. Photographs, graphs, diagrams.
(E general, A4)

361-E. Anchorage and Location of Inserts in Die Castings. T. P. Barbicane. *Machinery* (London), v. 82, May 29, 1953, p. 1015-1018.
Different types of steel inserts which may be used. Diagrams.
(E13, ST)

362-E. Beryllium-Copper Die Cavity Inserts. L. C. Barton. *Machinery* (London), v. 82, May 29, 1953, p. 1018-1021.
Advantages of using Be-Cu inserts. Compares performance with those of die or hobbing-steels.
(E13, Be, Cu, TS)

363-E. New A.P.V. Foundry Layout Planned for Flexibility of Production. *Metal Industry,* v. 82, May 29, 1953. p. 437-438.

Layout of a foundry capable of producing stainless steel, Al, and Cu-base alloy castings. Photographs. (E general, Al, Cu, SS)

364-E. Pressure Die-Casting Review. Die-Castings in Begwaco Gas Meters. *Metal Industry,* v. 82, May 29, 1953, p. 443-446.

Describes and illustrates parts which are pressure die-cast. (E13, CI)

365-E. Alloys and Melting Practice. *Modern Metals,* v. 9, June 1953, p. 40-41, 44, 46, 48-49.

Zn and Al die casting alloys with respect to melting practice, dross recovery, contamination, permanent mold melting, automatic ladling, and fuel consumption. Diagrams. (E13, E12, Zn, Al)

366-E. Casting and Forging of Titanium and Its Alloys. F. H. Vandenburgh. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951. p. 77-82; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Mechanical properties of Ti and Ti alloys in the as cast and forged states. (E general, F general, Q general, Ti)

367-E. (Dutch.) **Nodular Cast Iron.** *Metalen,* v. 8, no. 7, Apr. 15, 1953, p. 165-171.

College report presented by Prof. A. de Sy at the Polytechnic Institute, Delft, Mar. 9 and 10, 1953. Various viewpoints on formation of nodular graphite. Graphs, diagrams. 9 ref. (E25, CI)

368-E. (French.) **Graphs in the Foundry, Guides for Technical Management.** J. Pascal. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 167-168, 171, 173.

Value of graphs showing tonnages charged for each successive smelting; tonnages of waste produced; yields; production results; and movement of supplies. Graphs. (To be continued.) (E general)

369-E. (French.) **Defects of Pressure Castings.** R. Grunberg. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 175, 177, 179.

Irregularities influencing precision and mechanical characteristics of cast pieces. (To be continued.) (E13)

370-E. (German.) **Present Status of the Spray Process in Repairing Scaling in Cupola Furnaces.** Kurt Krämer. *Giesserei,* v. 40, no. 7, Apr. 2, 1953, p. 165-167.

Advantages of gun application of refractory repairs. Graphs. 3 ref. (E10)

371-E. (German.) **Desulfurizing Iron in Foundry Practice.** K. Roesch. *Giesserei,* v. 40, no. 9, Apr. 30, 1953, p. 230-234.

Desulfurization of iron by means of lime and coal dust in reducing atmosphere after thorough mixing. Graphs, diagrams. (E10, CI)

372-E. (German.) **The Enslin Device, Its Operation and Resultant Errors.** O. Eckart. *Giesserei,* v. 40, no. 9,

Device for determining sand binding properties of bentonite. Sources of error and their elimination. Graphs. (E18)

373-E. (German.) **Properties and Use of Customary Foundry Molding Sands.** H. Benner. *Giesserei,* v. 40, no. 10, May 14, 1953, p. 266-268.

Synthetic sand is recommended since it can be used for very satisfactory molds made by unskilled workers. Complex castings should be made of special sands. Production and merits of cores made of green and dry sand and by the Croning process. Diagrams, tabulated data. (E18)

374-E. (German.) **Eliminating Difficulties in Production of Fuse Caps During Aluminum Chill Casting.** *Giesserei,* v. 40, no. 11, May 28, 1953, p. 294-296.

Ways of producing caps and possibilities of meeting a variety of requirements by choice of correct mold construction. Diagrams. (E11, Al)

375-E. Outstanding Opportunities for the Foundry Industry. James H. Smith. *American Foundryman,* v. 23, June 1953, p. 42-47.

Trends which may revolutionize the foundry industry. Photographs. (E general)

376-E. A Modernized Small Foundry. *Canadian Metals,* v. 16, June 1953, p. 30-32.

How careful preliminary study of similarized installations led to the modernization and improvement of functional layout without interrupting production. (E general)

377-E. Centrifugal Casting in a Sand Mould. L. J. LeBlanc. *Canadian Metals,* v. 16, June 1953, p. 34, 36.

Production of soil pipe which is less brittle than that cast in permanent molds. Diagrams. (E14, CI)

378-E. Cupola Melting of Grey Iron. Some Consideration of Fluxes. D. A. Dodson. *Canadian Metals,* v. 16, June 1953, p. 38, 40.

Methods of flux treatment. (E10, B21, C1)

379-E. Zirconium Silicate. Its Use in Foundry Moulds. *Ceramics,* v. 5, Apr. 1953, p. 67-70.

Effect on castings, core mixes, and green sand molds. (E19)

380-E. Tin and Leaded-Tin Bronzes. Harold J. Roast. *Foundry*, v. 81, July 1953, p. 94-97, 229-230.

Properties of various tin and leaded-tin bronze alloys and foundry practice. (E general, Cu, Sn)

381-E. Castings. A Material for Ammunition. Frank E. Shumann. *Foundry*, v. 81, July 1953, p. 88-93.

Foundry techniques were successfully adapted to the production of a variety of steel and malleable iron shells. Special requirements in producing castings and typical product examples. Photographs. (E general, CI)

382-E. Effects of Vibration During Solidification of Castings. W. Rostoker and M. J. Berger. *Foundry*, v. 81, July 1953, p. 100-105, 260-265.

Effect on grain size and growth and separation of eutectic compounds. Micrographs. 9 ref. (E25, Cu, Al)

383-E. Coremaking Speeded by Use of Heated Corebox. W. M. Peterson. *Foundry*, v. 81, July 1953, p. 106-107, 232.

Cores are blown and baked in one operation by use of electrically heated corebox and fast setting sand mixture. Photographs. (E21)

384-E. Conventional Equiment Used in New Shell Molding Process. *Foundry*, v. 81, July 1953, p. 169-170.

Process which utilizes normal foundry equipment and drying oil binders in the production of a form of shell mold. Diagrams. (E16)

385-E. Shell Molding Comes of Age. A. J. Bzdula and H. A. Taylor. *General Electric Review*, v. 56, July 1953, p. 38-41, 59.

The process illustrated. (E16)

386-E. Where Does Shell Molding Fit in Your Parts Picture? H. S. Shroka. *Iron Age*, v. 171, June 18, 1953, p. 154-157.

Process and problems encountered in its adaptation. Photographs. (E16)

387-E. Making Light Alloy Castings in Shell Moulds. *Machinery* (London), v. 82, June 5, 1953, p. 1041-1048.

Techniques for Al and Au castings varying widely in design, weight, size, and application. Photographs. (E16, Al, Au)

388-E. Production of Zinc Alloy and Aluminium Die Castings for Lucas Motor Car Accessories. *Machinery* (London), v. 82, June 26, 1953, p. 1206-1214.

Equipment and methods of production. (E13, T21, Zn, Al)

389-E. Permanent-Mold Gray-Iron Castings. Edward C. Hoenicke. *Mechanical Engineering*, v. 75, July 1953, p. 549-550.

Types of castings, tolerances, and physical and mechanical properties. (E12, P general, Q general, CI)

390-E. Diecastings and Extruded Sections. H. K. Barton and L. C. Barton. *Mechanical World and Engineering Record*, v. 133, June 1953, p. 250-253.

An evaluation of the respective merits of die castings and extruded sections in a variety of applications. Diagrams. (E13, F24)

391-E. Metal Casting Methods. I. Some General Considerations. II. Centrifugal Casting. J. B. McIntyre. *Metallurgia*, v. 47, no. 283, Apr. 1953, p. 179-182; May 1953, p. 231-236.

Methods employed in the production of shaped castings and ingots for subsequent working. Centrifugal casting process and its application to horizontal and vertical axis machines. Production of pipes, cylinder liners, gear blanks, and internally chilled hollow phosphor bronze sticks. Diagrams. 14 ref. (E14, Cu, CI)

392-E. New A.P.V. Factory and Foundries. Expansion Needs Met by Move to Crawley. *Metallurgia*, v. 47, June 1953, p. 295-299.

Layout and equipment, including sand plant, core shop, nonferrous and stainless steel foundries, and testing and control. Photographs. (E general, S general, SS, EG-a)

393-E. Gold, Silver and Jewelry Industries. Report on Research Progress 1951-52. *Metallurgia*, v. 47, June 1953, p. 311-312.

Sand casting of Ni-Ag, investment casting, lustrous metallic surfaces on costume jewerly, electrogilding, anodized Al badges, and color of metals. (E11, E15, L19, Ni, Ag, Au, Al)

394-E. Sealing Porous Castings by Impregnation. *Overseas Engineer*, v. 26, June 1953, p. 381.

Process for effectively sealing ferrous and nonferrous castings by the vacuum impregnation method. (E25, Cu, Al, CI)

395-E. Mass Production Plus Easy Finishing by Die Casting. *Precision Metal Molding*, v. 11, July 1953, p. 29.

Production of oiler parts. (E13, Zn)

396-E. Shell Molding vs. Conventional Sand Casting. Some Dramatic Cost Comparisons. *Precision Metal Molding*, v. 11, July 1953, p. 32-33, 74.

Compares production costs of two small iron castings. Photographs. (E16, E11, CI)

397-E. Forward, Backward—Start, Stop. F. Shires. *Precision Metal Molding,* v. 11, July 1953, p. 34, 70.

Use of plaster molds for brass castings. (E16, Cu)

398-E. Use of Steel Insert Gives Die Casting With a "Backbone". *Precision Metal Molding,* v. 11, June 1953, p. 35, 84.

Reinforced Al die castings for pins which join vertical members of a pipe scaffolding. (E13, Al, CN)

399-E. Small Run Replicas Produced by Slush Castings. *Precision Metal Molding,* v. 11, July 1953, p. 36-37, 72.

Describes process. Photographs. (E16)

400-E. The Extra Values of Small Die Castings. J. R. Schushardt. *Precision Metal Molding,* v. 11, June 1953, p. 38-39, 85-86.

Why small die castings are frequently less costly than screw machine or stamped pieces. Photographs. (E13)

401-E. Investment Castings in Special Typesetting Machine Save Machine Tool Time. *Precision Metal Molding,* v. 11, June 1953, p. 40-41, 78-79.

Investment castings for use in the "Intertype Fotosetter". Photographs, diagrams. (E15, Cu, TS)

402-E. One-Piece Casting With Cored Undercut. *Precision Metal Molding,* v. 11, June 1953, p. 42.

A permanent mold cast frame for house numbers. (E12)

403-E. Here Are Two Ways a Manufacturer of Dial Telephones Meets Cumulative Tolerances. *Precision Metal Molding,* v. 11, June 1953, p. 44-45.

Die cast Zn vs. drawn brass and sintered gear vs. machined rod. (E13, H15, Zn, Cu)

404-E. Low Contact Resistance With an Aluminum Die Casting. *Precision Metal Molding,* v. 11, July 1953, p. 44, 46.

Castings in a 4-way electrical switch. (E13, T1, Al)

405-E. Mechanized Shell Mold Casting. *Precision Metal Molding,* v. 11, June 1953, p. 47.

New shell molding machine. (E16)

406-E. Rigid Structure: Basic Design Factor in Camera Construction. *Precision Metal Molding,* v. 11, June 1953, p. 48, 50, 85.

Die castings used in the "Polaroid Camera". (E13)

407-E. Let Die Castings Help Keep Costs in Line. Allen G. Gray. *Steel,* v. 133, July 6, 1953, p. 106-110, 163-164.

How Zn and Al die castings have improved quality and lowered cost. Properties, finishability and stability. Photographs, tables. (E13, Al, Zn)

408-E. Precision Investment Castings. Curtis L. Graversen. *Western Machinery and Steel World,* v. 44, June 1953, p. 73-76.

Describes and illustrates process. (E15)

409-E. Melting Trials in an Acid-Lined and a Basic-Lined Cupola Under Comparable Conditions. E. Piwowarsky and H. Schmidt. Henry Brutcher Translation 2992. 20 pages. (From *Die Giesserei. Technischewissenschaft. Beihefte,* 1952, no. 6-8, p. 261-271.

Series of trials to determine the temperatures, melting losses, and slag compositions with different cupola linings. Tables, graphs. 10 ref. (E10, CI)

410-E. (German.) Analysis of Losses in Cold and Hot-Blast Cupola Furnaces. G. Clas and J. Schleissner. *Giesserei,* v. 40, no. 8, Apr. 16, 1953, p. 190-193.

Compares reactions and production on both types of furnace. (E10, CI)

411-E. (German.) Work of REFA in Model Construction. F. Lamm. *Giesserei,* v. 40, no. 8, Apr. 16, 1953, p. 193-203.

A wooden model of a casting mold was subjected to a practical REFA (National Commission for Study of Work) study to get correct price figures. Tables. Ref. (E19)

412-E. (German.) Productivity, Management, and Managerial Efforts in German Foundry Practice. E. Piwowarsky. *Giesserei,* v. 40, no. 8, Apr. 16, 1953, p. 203-210.

Measures dealing with workers and management. Graphs. 10 ref. (E general, A5)

413-E. Precision Casting. *Aircraft Production,* v. 15, July 1953, p. 253-257.

Production of complex parts in Nimonic alloys. Photographs. (E15, Ni, CI)

414-E. Maintenance in the Foundry. T J. Glaza. *American Foundryman,* v. 24, July 1953, p. 40-44.

Reduction of maintenance costs and importance of preventive and corrective maintenance. Photographs. (E general)

415-E. Dietert Process for Precision Molds. *American Foundryman,* v. 24, July 1953, p. 50-51.

Molding materials and baking cycle. Photographs, diagrams. (E19)

416-E. The Influence of Molding Materials on the Incidence of Hot

Tearing. I. The Influence of Molding Materials on Hot Tearing. II. J. M. Middleton. *American Foundryman,* v. 23, June 1953, p. 67-74; v. 24, July 1953, p. 60-66.

Technique developed for determination of hindrance to contraction of a steel casting offered by various molding media. Graphs, tables, micrographs. (E19, E25, CI)

417-E. High Efficiency Brass Melting in Low-Frequency Furnaces. G. N. Landis. *American Foundryman,* v. 24, July 1953, p. 72-73.

Practical method for determining correct cross-sectional area of the channel which forms the one-turn secondary winding. Diagrams. (E10, Cu)

418-E. The Flow of Moulding Sand. J. Gittus. *British Cast Iron Research Association,* v. 4, June 1953, p. 560-567.

"Flowability" property of sand. Tables, graphs. (E18)

419-E. The Mechanical Clamping of Shell Moulds. D. A. Taylor. *British Cast Iron Research Association,* v. 4, June 1953, p. 568-570.

Method consisting of placing shells in pneumatically operated clamp before casting. Diagram, photographs. (E16)

420-E. Hot-Metal Receivers for Iron Foundries. *Engineering,* v. 176, July 1953, p. 27.

Use to improve performance of normal cupola. Diagrams, photograph. (E10, Fe)

421-E. Norwegian Vanadium-Titanium Pig Iron. J. Sissener. *Foundry Trade Journal,* v. 95, July 2, 1953, p. 5-6.

Characteristics of the alloy and its benefits to cast products. Graphs. (E general, CI)

422-E. Foundry Practice at Fraser & Chalmers. A W. Bartlett. *Foundry Trade Journal,* v. 95, July 9, 1953, p. 51-52, 64.

Melting and casting procedures for producing turbine parts. Photographs. (E general, CI)

423-E. How Shell Molding Process Simplifies Foundry Art. Alfred E. Green. *Industrial Gas,* v. 31, June 1953, p. 10, 20-22.

Fundamental operation of this foundry practice which offers the advantages of greater production, better castings, and closer tolerances. (E16)

424-E. How to Improve Carbon Pickup in Foundry Iron. Eugene Fry. *Iron Age,* v. 172, July 16, 1953, p. 140-141.

Advantages of using a new high-carbon coke. (E10, Cl)

425-E. Complex Aluminum Part Successfully Shell Molded. R. V. Heath. *Iron Age,* v. 172, July 23, 1953, p. 124-128.

Process and results, including use of Al and Mg matchplates. Photographs. (E16, Al, Mg)

426-E. Shell Moulding. Present Position and Techniques. D. N. Buttrey. *Iron & Steel,* v. 26, July 1953, p. 363-364, 368.

Characteristics and basic operation of the process. (E16)

427-E. A High-Production Process for the Manufacture of Cast Iron Gutters. *Machinery* (London), v. 83, July 10, 1953, p. 57-58.

Operations. Photographs. (E11, CI)

428-E. A Practical Approach to Casting Design. Robert J. Franck. *Product Engineering,* v. 24, July 1953, p. 192-195.

Use of experimental stress analysis and scale models to simplify and improve design of critical steel castings. Photographs. (E17, Q25, CI)

429-E. Automatic Foundry Nears Reality. Leonard J. Bishop. *Steel,* v. 133, July 13, 1953, p. 98-100.

How shell molding machines tied in with other modern handling equipment make possible volume production of quality castings with low manpower requirements. (E16)

430-E. (French.) **The Vitality of Clay in Foundry Sand.** Pierre Nicolas. *Fonderie,* no. 87, April 1953, p. 3392-3400.

Various properties of foundry sand as related to the type of clay content. Research on new sand and choice of sand for regeneration. Diagrams. (E18)

431-E. (French.) **The Effect of Temperature on Foundry Clays.** Jacques Graviche. *Fonderie,* no. 87, Apr. 1953, p. 3400-3402.

Experiments on kaolitic and bentonitic foundry clays. Graphs. (E18)

432-E. (French.) **Mold Cars.** *Fonderie,* no. 87, Apr. 1953, p. 3403-3407.

Various car constructions. Diagrams. (E19)

433-E. (Hungarian.) **Two New Processes for the Modification of Cast Iron.** Béla Körös. *Kohaszati Lapok (Ontode),* v. 3, no. 12, Dec. 1952, p. 285-286.

Turbovski's process of modifying white iron by adding 20-30% molten gray iron and Ebarski's modification using alternate charges in the cupola. (E10, CI)

434-E. (Swedish.) **Rate of Combustion in the Cupola.** Wolfgang von Preen. *Gjuteriet,* v. 43, no. 2, Feb. 1953, p. 25-28.

Development of a formula based on the heat balance which permits the calculation of combustion rate. Graphs, diagrams. (E10)

435-E. (Swedish.) Cost Control and Cost Reduction in Foundries. Bo Casten Carlberg. *Gjuteriet,* v. 43, no. 2, Feb. 1953, p. 29-37.

Importance of cooperation between production and cost departments, and prompt and accurate calculations. Diagrams, graphs. (E general)

436-E. (Swedish.) Use of Pitch in Molding Sand. Olof Carlsson. *Gjuteriet,* v. 43, no. 3, Mar. 1953, p. 47-52.

The effect of pitch and coal dust on the properties of molding sands at different moisture contents. Graphs, diagrams, tables. (E18)

437-E. (Swedish.) A Study of an Electric Foundry Drying Stove. Sixten Ryden. *Gjutereit,* v. 43, no. 4, Apr. 1953, p. 61-68.

How drying is influenced by the percentage of drying stock in the stove, velocity of gases, and amount of fresh air admitted. Photographs, tables, graphs, diagrams. (E19)

438-E. (Swedish.) Standards for Big Molding Boxes. *Gjutereit,* v. 43, no. 4, Apr. 1953, p. 69-76.

Proposes that flask parts without bars, flask sides, flask parts with bars, and bar grids be standardized. Diagrams, tables, graphs. (E19)

439-E. Production Control at Alcan's Aluminum Foundry. V. J. Zabec. *Canadian Chemical Processing,* v. 37, July 1953, p. 66-67.

Production methods and laboratory equipment. Photographs. (E general, Al, Mg)

440-E. Grain Refinement of Aluminum and Its Alloys. D. A. Dodson. *Canadian Metals,* July 1953, p. 24-27.

Factors involved, grain refining agents, and foundry practices. (E25, Al)

441-E. What the Fluidity Test Reveals About Gray Cast Iron. Lew F. Porter and Philip C. Rosenthal. *Foundry,* v. 81, Aug. 1953, p. 94-99, 245-249.

What has been learned about the behavior of gray cast iron from the fluidity test and how it can serve as a foundry tool. Graphs, diagrams. (E25, CI)

442-E. Outstanding Opportunities for the Foundry Industry. James H. Smith. *Foundry,* v. 81, Aug. 1953, p. 100-107.

Molding methods and materials; metallurgy and heat treatment of cast iron; methods engineering; and educational programs for the foundry industry. Photographs. (E general, J general, CI)

443-E. Studies High Pressure Molding. Richard Heine and Tom Barlow. *Foundry,* v. 81, Aug. 1953, p. 146, 148, 229.

Research pertaining to the process, sands and resins used. Graphs. (E19, E18)

444-E. Things to Watch in Nonferrous Foundry Practice. Hiram Brown. *Foundry,* v. 81, Aug. 1953, p. 108-110, 236-237.

Practices which have important influence on casting quality. Photographs. (E general, EG-a)

445-E. Formulas for Determining Weights of Castings. *Foundry,* v. 81, Aug. 1953, p. 151-152.

Tables and diagrams. (E general)

446-E. How Fast Should a Mold be Poured? Harry W. Dietert. *Foundry,* v. 81, Aug. 1953, p. 205-206.

Pouring time formula and graphs. (E23, CI)

447-E. Cable Link Conveyor Offers Unusual Flexibility. W. G. Patton. *Iron Age,* v. 172, July 30, 1953, p. 92-93.

Conveyor flexible in two planes permits quick dipping of 110-lb. cores. (E21, A5)

448-E. The Apparent Thermal Conductivities of Moulding Materials at High Temperatures. D. V. Atterton. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 201-211; disc., p. 211.

Data in the temperature range 20-1600° C. Tables, graphs, diagrams. 15 ref. (E19)

449-E. Refractories for Aluminium Melting. *Light Metals,* v. 16, July 1953, p. 232-234.

Effect of molten Al on refractories. Lists refractories for reverberatory, liquation, electric, resistor-heated and heat treatment furnaces. (E10, Al)

450-E. Dielectric Core Baking. *Metal Industry,* v. 83, July 17, 1953, p. 45-46.

Study of operations with synthetic resin binders. Diagram, table, photographs. (E21)

451-E. Operational Research and Materials Handling. J. Murdoch. *Operational Research Quarterly,* v. 4, June 1953, p. 25-29.

Benefits derived from use of operational research in a foundry. Diagrams. (E general, S12)

452-E. Combine and Eliminate. The Key to Economical Use of Die Castings. S. Szelwach. *Precision Metal Molding,* v. 11, Aug. 1953, p. 28-29, 72.

Redesign of a rangefinder. Photographs. (E13)

453-E. Flatness and Dimension Are Held in These Shell Mold Castings. Walter Cuskie. *Precision Metal Molding,* v. 11, Aug. 1953, p. 37, 65-66.
How shell molding reduces costs. (E16)

454-E. Lead Die Casting. Case History of a Part That Was "Impossible" by Any Other Method. W. M. Halliday. *Precision Metal Molding,* v. 11, Aug. 1953, p. 42-43, 84-86.
Production of a conical sealing plug. Dimensions and way of forming not formerly feasible. (E13, Pb)

455-E. (French.) **Drying Foundry Molds on the Spot.** Georges Ulmer and Maurice Decrop. *Fonderie,* May 1953, p. 3431-3443.
Heating by electricity, and by gas, liquid and solid fuels. Choice of drying apparatus. Tables, graphs, photographs, diagrams. (E19)

456-E. (French.) **Making a Tap Hole in the Cupola by Means of a Template.** *Fonderie,* May 1953, p. 3445-3446.
Diagrams. (E10)

457-E. (German.) **Retrospective View of the Technical Exposition, Hanover, 1953.** H. Jungblut. *Giesserei,* no. 13, June 25, 1953, p. 325-334.
Machines for treating foundry sand and for making molds and cores; equipment for melting; techniques of cleaning and conveyance; laboratory arrangements and general industrial layouts. Photographs, diagrams. (E general)

458-E. (German.) **Rammed-Crucible, Line-Frequency, Induction Furnace for a Three-Phase Power Supply.** Robert Lethen. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 267-272.
The problem of multiphasic connection to 3-phase mains. A single phase furnace for Fe and Al melting which is wired so that a 3-phase symmetrical load exists for the power supply. Photographs, diagrams 4 ref. (E10, Fe, Al)

459-E. (Russian.) **Problems of the Choice of High-Frequency Generators for Induction Melting Furnaces.** G. S. Vainberg. *Promyshlennaia Energetika,* v. 9, no. 11, Nov. 1952, p. 23-24.
Data and suggestions. Tables. 2 ref. (E10)

460-E. (Russian.) **Precision Casting With Meltable Patterns.** M. Kornakov. *Za Ekonomiiu Materialov,* no. 3, Oct. 1952, p. 72-76.
Savings resulting from use of precision castings instead of forgings. Stainless and carbon steels. (E15, E17, ST)

461-E. (Russian.) **Centrifugal Casting of Gears.** I. Bobrov and K. Smirnova. *Za Ekonomiiu Materialov,* no. 4, Nov. 1952, p. 77-79.
Apparatus used. Diagrams. (E14)

462-E. Effects of Mould Resistance on Internal Stress in Sand Castings. R. N. Parkins and A. Cowan. *Foundry Trade Journal,* v. 95, July 23, 1953, p. 105-111.
Experimental method and results. Photograph, tables, graphs, diagrams. 5 ref. (E11, Cu, Al, CI)

463-E. Operating Experiences With Hot-Blast Cupolas in Great Britain. F. C. Evans. *Foundry Trade Journal,* v. 95, July 23, 1953, p. 113-117.
Results obtained using British fuels and materials. Equipment. Diagrams, graphs, photograph. (E10, Si, Mn, S, Fe, CI)

464-E. Another Hot-Blast Cupola Plant. *Foundry Trade Journal,* v. 95, July 23, 1953, p. 119-122.
Describes new installation and its operation. Diagram, photographs. (E10)

465-E. Estimating Construction Costs of Die Casting Dies. H. K. Barton. *Machinery* (London), v. 83, July 31, 1953, p. 223-230.
Different operations which must be considered in estimating the costs. Tables. (E13, TS)

466-E. The Overseas Foundry. *Overseas Engineer,* v. 27, Aug. 1953, p. 28-29.
Overcoming fuel problems, furnace atmosphere control and Al alloy die casting. Photographs, tables. (E general, Al)

467-E. (French.) **Contribution for Microscopical Examination of Core Binders.** M. Franz Roll. *Fonderie,* no. 89, June 1953, p. 3480-3487.
Methods and equipment. Photographs, micrographs. (E18)

468-E. (French.) **Defects of Pressure Castings.** R. Grunberg. *Métallurgie et la Construction Mécanique,* v. 85, no. 1, Jan. 1953, p. 37, 39, 41; no. 2, Feb. 1953, p. 113, 115; no. 3, Mar. 1953, p. 175, 177, 179; no. 4, Apr. 1953, p. 265, 267.
Part 1: Classifies various defects according to the nature of the piece and emphasizes surface defects. Part 2: Influence of foreign agents. Part 3: Irregularities influencing precision and mechanical characteristics of cast pieces. Part 4: Composition and structure of Zn, Al, and Mg alloys and irregularities influencing machinability. (To be continued) (E13, Zn, Al, Mg, AY)

469-E. (French.) **Graphs in the Foundry, Guides for Technical Management.** J. Pascal. *Métallurgie et la Construction Mécanique,* v. 85, no. 3,

Mar. 1953, p. 167-168, 171, 173; no. 4, Apr. 1953, p. 259, 261, 263; no. 5, May 1953, p. 357-358.

Value of graphs showing tonnage charged for each successive heat, tonnage of waste produced, yields, production results and movement of supplies. Graphs. (E general)

470-E. (French.) **Core Work in Foundries. Steel, Cast Iron, Bronze.** Marcel Guédras. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 361, 363, 365, 367.

Function of the core in casting, types of sand, its constituents and its preparation. Table, photographs. (E21, E18, Cu, CI)

471-E. (French.) **Pressure Casting, One of the Processes for Mass Production.** R. Grunberg. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 369, 371, 373.

Methods of pressure casting and the materials necessary for each. Tables.
(E13, Sn, Pb, Zn, Al, Mg, Cu, CI)

472-E. (French.) **Mechanized Casting.** J. Pascal. *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 469-471, 473, 475, 477.

Historical survey of molding machines with operating characteristics. Diagrams, photographs. (E19)

473-E. (French.) **Magnesium Pressure Castings for Automobiles.** *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 479, 481.

Advantages and savings effected by the use of Mg in motor parts. Graph. (To be continued)
(E13, T21, Mg)

474-E. (German.) **Comparison of Costs Between Acid and Basic Cupola Furnaces.** H. Schmidt. *Giesserei,* v. 40, no. 12, June 1953, p. 301-304.

Analyzes costs. Tables. (E10, CI)

475-E. (German.) **Further Use of Old Sand.** H. Hickisch. *Giesserei,* v. 40, no. 12, June 1953, p. 308-309.

Computes mathematically the amount of dust permissible in reclaimed foundry sand. Graph. (E18)

476-E. (German.) **Hints on Economic Procedure in a Small, Light-Metals Foundry.** H. Mahr. *Giesserei,* v. 40, no. 12, June 1953, p. 315-318.

Layout of foundry in case of limited space, individual manufacture of large pieces, assembly-line technique, better use of space by stack and open casting, and use of models. Diagrams. (E general)

477-E. (German.) **Foundry Machines.** C. Stieler. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 572-574.

Molding, core injection, shake-out, and cleaning equipment. Diagrams, photographs. 4 ref. (E19, E21, E24)

478-E. (Hungarian.) **Preparatory Work in Foundries.** Sandor Hargitay. *Ontöde,* v. 3, no. 11, Nov. 1952, p. 251-259.

Proper construction of molds for hand and machine casting. Organization of casting operations. Diagrams, photograph. (E17)

479-E. (Hungarian.) **Ideal Handling of Molds and Other Experiments.** Béla Körös. *Ontöde,* v. 3, no. 11, Nov. 1952, p. 259-264.

Experiments for establishing factors for reducing wear of molds. Tables, graphs. (E19)

480-E. (Hungarian.) **Prerequisites for the Manufacture of Nodular Cast Iron.** Istvan Karsay. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 25-30.

Theoretical explanations for the formation of spheroidal graphite. Production, effect of addition elements, and applications. Diagrams, micrographs. 11 ref. (E25, CI)

481-E. (Hungarian.) **Hungarian Bentonites as Foundry Binding Agents.** Janos Barna. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 30-39.

Types of Hungarian bentonites, their properties and binding capacity in the crude and dried state and after heat treatment. Graphs. 21 ref. (E18)

482-E. (Hungarian.) **The Casting of Iron Rolls From the Reverberatory Furnace.** Aladar Schleicher. *Ontöde* v. 4, no. 2, Feb. 1953, p. 45-58.

Compares use of above with cupola furnace. 11 ref. (E10, CI)

483-E. (Hungarian.) **The Technology of Core Binding With Water Glass.** Janos Szekeres. *Ontöde,* v. 4, no. 3, Mar. 1953, p. 49-56.

Technical experiments. Effect of water glass concentration on binding capacity and viewpoints to be considered in determining the composition of the core. Graphs, photograph, diagram. (E21)

484-E. (Hungarian.) **1952 Hungarian Experiments for the Production of Nodular Chilled Iron Rolls.** Béla Körös. *Ontöde,* v. 4, no. 4, Apr. 1953, p. 73-82.

Reports on experimental program. Details of processes and results are outlined and tabulated. Micrographs. (E25, CI)

485-E. (Hungarian.) **The Production of Pure Iron Castings by the Use of Centrifugal Casting.** Sandor Vékony. *Ontöde,* v. 4, no. 4, Apr. 1953, p. 91-94.

Pilot plant experiments. Diagrams, graphs. (E14, Fe)

486-E. (Swedish.) **Defects in Castings and Their Causes. IV. Causal Analysis of Nine Types of Surface Defects.** Jörgen Drachmann, Göthe Fernheden, and Holger Pettersson. *Gjuteriet,* v. 43, no. 5, May 1953, p. 81-89.

Rough surface, burn-on, metal penetration, flash, strain, swell, cuts and washes. Complete discussion of burn-on with two principal causes. Photographs. (E25)

487-E. The Status, Development and the Possible Australian Future of Spheroidal Graphite Cast Irons. L. C. Bogan. *Australasian Engineer,* Mar. 1953, p. 66-72; Apr. 1953, p. 46-52; May 1953, p. 42-46; disc., p. 46-52.

Paper presented to The Australian Institute of Metals, Newcastle Branch, Oct. 15, 1952. History of spheroidal graphite structures in cast iron. Basic metallurgical principles for commercial manufacture of nodular iron by the Mg process are provided. Castability and founding properties, heat treating and mechanical properties. Commercial techniques. Micrographs. 42 ref. (E25, Q general, M general, CI)

488-E. Production of Diesel-Engine Castings in Grey Iron. J. R. Charlton. *Foundry Trade Journal,* v. 95, July 30, 1953, p. 137-145.

Methods adopted in a jobbing foundry. Photographs. (E11, CI)

489-E. Ferrous Castings in the Refractories Industry. E. F. Brown. *Refractories Journal,* July 1953, p. 289-293; disc., p.. 294-296.

Manufacture and use of wear-resistant castings. Photographs. (E11, T29, CI)

490-E. The Listex Blackstone Grey Iron Foundry. *Australasian Engineer,* May 7, 1953, p. 53-55.

Plant and techniques. Photographs. (E general, CI)

491-E. Straight Line Setup for Casting Tank Hulls. Thomas Mac New. *Automotive Industries,* v. 109, Aug. 1, 1953, p. 70-72.

Casting hulls and turrets for an Army tank. Photographs. (E general, CI)

492-E. Application of Electric Heat in Grey-Iron Foundries. G. Keller. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 403-409.

Applications. Compares relative economies of electric and fuel-fired furnaces. Photographs. (E10, CI)

493-E. Radio-Frequency Heating Of Foundry Cores. H. E. Schoch. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 421-425.

Present conventional methods for drying foundry cores and basic principles of radio-frequency heating. Advantages in drying of foundry cores in conjunction with the new synthetic resin binders. Photographs. (E21)

494-E. Modern Arc Melting Furnace Plant Features Swivelling Roof for Rapid Top Charging. R. Lambert. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 429-435.

Equipment in a Belgian foundry. Photographs, diagrams. (E10)

495-E. Pelleted Foundry Pitch. E. Brett Davies, T. F. N. Matthews, and G. Smart. *Foundry Trade Journal,* v. 95, July 30, 1953, p. 151-156.

British applications of pitch for foundry purposes. Tables, graphs, photographs. (E general)

496-E. Rules Can Be Broken: Zinc Die Castings Don't Always Cost More. *SAE Journal,* v. 61, Aug. 1953, p. 78-79.

Based on paper "What Alloy Should Be Used to Die Cast Decorative Automotive Parts—Zn, Al or Mg?" by M. R. Caldwell and C. Pack presented at SAE National Passenger-Car, Body and Materials Meeting, Mar. 4, 1953. Comparative finishing operations, design, melting points and production rates. (E13, Zn, Al, Mg)

497-E. (German.) **Is Capital Needed for Rationalizing?** H. Krippendorff. *Giesserei,* v. 40, no. 14, July 9, 1953, p. 349-354.

Need and ways for planning and increasing production yields in foundry practice. Exchanges of experience between foundries are recommended. (E general)

498-E. (German.) **Casting a Complex Centrifuge Base.** H. Seifert. *Giesserei,* v. 40, no. 14, July 9, 1953, p. 364-367.

Process using two skeletal models and utmost skill of operator. Photographs, diagrams. 3 refs. (E17, CI)

499-E. (Swedish.) **Rationalizing Without Large Capital Investment.** C. G. Söderlund. *Gjuteriet,* v. 43, no. 6, June 1953, p. 103-107.

Effects of the degree of mechanization on production per hour and on cost of production in the author's foundry. Tables, graphs. (E general)

500-E. Turbine Starter. *Aircraft Production,* v. 15, Aug. 1953, p. 302-308.

Gravity die casting of turbine starter. Photographs, diagrams. (E13)

501-E. Construction and Operation of Coal-Fired Air Furnaces. Cecil F.

Semrau. *American Foundryman,* v. 24, Aug. 1953, p. 34-39.
Diagrams. (E10)

502-E. It Costs More Than You Think. Harold Brown. *American Foundryman,* v. 24, Aug. 1953, p. 40, 42.
Cost of casting from receipt through ultimate use in the field. Photographs. (E general)

503-E. Steel Casting Design—A Story in Pictures. *American Foundryman,* v. 24, Aug. 1953, p. 48-51.
Example of development of compressor crankshaft casting. Diagrams, photographs. (D general, CI)

504-E. Understanding Melt Quality. J. G. Kura. *American Foundryman,* v. 24, Aug. 1953, p. 56-63.
Melt quality and effect of mold materials on molten metal. Simplified outline of the theory of gases in Cu-base alloys. Radiographs, photomicrographs and graphs. 7 ref. (E25, N16, Cu)

505-E. The Future of Zinc in Die Castings. W. J. During. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 109-116.
Design, functional and economic relationships. (E13, Zn)

506-E. The Use of Calcium Carbide in Cupola Melting. Sam F. Carter and Ralph Carlson. *Canadian Metals,* v. 16, Aug. 1953, p. 30, 32.
Study of effects of CaC_2 on limitations in cupola melting. Tables. (E10, CI)

507-E. On High-Temperature Melting and Pouring of Gray Iron Castings. I. Ichiro Iitaka and Kazuhiko Sekiguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 1-3.
Melting and pouring at various temperatures and the effect on hardness. Graphs. (E10, E23, Q29, CI)

508-E. Research on the Flow-Dynamics of Molten Metals. III. Kiyoshi Yokota and Eisuke Sato. *Castings Research Laboratory, Report,* no. 4, 1953, p. 7-9.
Diagrams, graphs. (E25, P12, Hg)

509-E. Relation Between Melting Condition and Casting Defects in Iron Castings. III. Nobutaro Kayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 10-12.
Graphs. (E general, CI)

510-E. Research on Die-Casting Process. I. Size of Gate. II. Length of Die Casting. Nobutaro Kayama and Masakazu Ichida. *Castings Research Laboratory, Report,* no. 4, 1953, p. 13-16.
Studies on effects of dimensional variations on the quality of castings. Diagrams, graphs. (E13)

511-E. Spheroidal Graphite Cast Iron. II. Especially as to the Effects of the Addition of Metallic Calcium and Calcium Silicide on Gray Cast Iron. Takaji Kusakawa. *Castings Research Laboratory, Report,* no. 4, 1953, p. 20-22.
Possibility of reducing amount of $CaSi_2$ by adding it to the flux with CaF_2, KCl, or $NaBO_2$. Graphs, table. (E25, CI)

512-E. Blow Holes Occurring in the Fusion Zone Between Molten Cast Iron and Solid Steel. Tsunemitsu Muraki. *Castings Research Laboratory, Report,* no. 4, 1953, p. 30-32.
Experiment to show causes of blow holes. Tables, diagram, graph. (E25, CI)

513-E. Binding Strength Measurement of Green Sand Moulds. I. Jiro Kashima. *Castings Research Laboratory, Report,* no. 4, 1953, p. 36-38.
Determined by the penetrometer method. Graphs. (E18)

514-E. Molding Sand Binders. Toshisada Makiguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 39-42.
Advantages of dehydration by heating in a slight vacuum. Graphs, table. (E18)

515-E. Binding Property of Molding Sand. Jiro Kashima and Mototaka Mutaguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 43-45.
Determination of clay content by polarography method. Diagram, graphs. (E18)

516-E. Aluminum Casting Alloys. Vernon Swan. *Electrical Manufacturing,* v. 52, Aug. 1953, p. 97-103.
Composition, foundry considerations and properties of light-weight alloys suitable for sand, permanent mold or pressure die casting. Effect of application requirements on casting method. Tables. (E11, E12, E13, Al)

517-E. Effect of Heat on Clays and Its Bearing on the "Life" of Clay Bonds. S. Davidson and J. White. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 165-174.
Paper presented to the 50th annual meeting of the Institute of British Foundrymen at Blackpool. Describes bentonite clays, hydrous clay micas and montmorillonites. Swelling properties, effects of interlayer cations and loss of constitutional water. Thermal-analysis curves. Tables, graphs. 33 ref. (To be continued.) (E18)

518-E. Auto-Slagging Twin Tuyeres. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 175-178.

Slightly abridged from anonymous article in *Fonderie*. Recent French advances. Diagrams. (E10)

519-E. Cold Chamber Machine Adds Flexibility, Economy. C. H. Drewes. *Iron Age,* v. 172, Aug. 27, 1953, p. 112-114.

Die casting of Al, Cu, and Zn alloys. Photographs. (E13, Al, Cu, Zn)

520-E. Shell Moulding. New British Automatic Machine. *Iron and Steel,* v. 26, Aug. 1953, p. 393-394.

Describes and illustrates equipment. (E16)

521-E. Gravity Die Casting Foundry Extended. *Machinery (London),* v. 83, Aug. 14, 1953, p. 319-322.

Dies used at one foundry. Photographs. (E13, Cu)

522-E. Dimensional Tolerances for Steel Castings. Charles W. Briggs. *Mechanical Engineering,* v. 75, Aug. 1953, p. 619-621.

Paper presented at the Fall Meeting of the ASME, Chicago, Sept. 7-11, 1952. Condensed. Specifications, pattern tolerances, castability and casting dimensional tolerances. Tables. (E general, S14, CI, AY)

523-E. Tolerances and Specifications of Malleable Castings. James H. Lansing. *Mechanical Engineering,* v. 75, Aug. 1953, p. 621-624.

Paper presented at the Fall Meeting of the ASME, Chicago, Sept. 7-11, 1952. Condensed. Tables, photographs. (E general, S14, CI)

524-E. Die-Castings in the Olivetti Lettera 22. *Metal Industry,* v. 83, July 24, 1953, p. 67-69.

Pressure die casting of portable typewriter parts. Photographs. (E13, Al)

525-E. Founding Magnesium-Zirconium Alloys. H. J. Millward. *Metal Industry,* v. 83, July 31, 1953, p. 83-85.

Composition and properties of the alloys for aircraft castings. Photographs.
(E general, Q general, T24, Mg, Zr)

526-E. Porosity in "Y" Alloy Pistons. *Metal Industry,* v. 83, Aug. 1953, p. 130.

Detection of flaws and how to correct them. (E25, S13, Al)

527-E. Brass Pressure Die-Castings. *Metal Industry,* v. 83, Aug. 21, 1953, p. 145.

Difficulties associated with die casting alloys whose melting point is considerably higher than that of conventional die casting alloys. Photographs. (E13, Cu)

528-E. The Melting of Chill-Cast Tin Bronzes. *Metal Progress,* v. 64, July 1953, p. 180, 182, 184, 186.

Condensed from Chapters 4 and 5, "The Melting Process", of the book "Chill-Cast Tin Bronzes", by D. Hanson and W. T. Pell-Walpole, published by Edward Arnold & Co., London, England. Satisfactory melting procedure. (E10, Cu)

529-E. A Rapid Method of Dust Estimation in Iron and Steel Foundries. W. B. Lawrie. Paper from "Dust in Industry." Society of Chemical Industry, London, p. 9-12; disc., p. 12-14.

Method using visual estimation of photomicrographs against a standard scale. Photomicrographs, photographs. (E general, A5)

530-E. Precision Casting With Green Sand. *American Foundryman,* v. 24, Sept. 1953, p. 34-38.

Process and equipment. Photographs. (E11)

531-E. Evaluating Moulding Methods. *American Foundryman,* v. 24, Sept. 1953, p. 48-52.

Consists of "What Is Precision Casting?", Hiram Brown; "Green Sand Is Versatile", C. E. Maddick; and "Dry Sand for Heavy Work", George W. Anselman. Photographs. (E11)

532-E. Let's Look at High-Pressure Molding. R. W. Heine and T. E. Barlow. *American Foundryman,* v. 24, Sept. 1953, p. 54-56.

Process, properties of the sand and advantages. Graphs, photographs. (E19)

533-E. Evaluating Molding Methods. II. The Place of Shell Molding. J. B. Stazinski. Molding in Core Sand. George P. Antonic. **Casting in Metal Molds.** William B. Scott. *American Foundryman,* v. 24, Oct. 1953, p. 42-46.

Technical and economical advantages of shell, permanent and core molds. (E16, E12, E19)

534-E. Use and Abuse of Crucibles. R. H. Stone. *American Foundryman,* v. 24, Sept. 1953, p. 57-61.

Care and use of crucibles in foundries. Photographs. (E10)

535-E. The Use of Calcium Carbide in Cupola Melting. II. *Canadian Metals,* v. 16, Sept. 1953, p. 28, 32.

Effects of CaC_2 on some limitations recognized as existing in cupola melting. Tables. 4 ref. (E10)

536-E. Foundry Practice. William H. Salmon and Eric Simons. *Edgar Allen News,* v. 32, Sept. 1953, p. 203-204.

Preparation of patterns and 3-part stacked molds. Diagrams. (To be continued.) (E17, E19)

537-E. Economic Utilization of Copper-Base Alloys. *Engineering,* v. 176, Aug. 14, 1953, p. 222-224.
Foundry procedures.
(E general, Cu)

538-E. The Shell Moulding Process. I. D. N. Buttrey. *Engineering,* v. 176, Aug. 21, 1953, p. 251-252.
Abridged from paper presented during the 50th Annual Conference of the Institute of British Foundrymen, Blackpool, June 16-19, 1953. Characteristics and basic operation of the process. (To be continued.) (E16)

539-E. The Shell Moulding Process. II. D. N. Buttrey. *Engineering,* v. 176, Aug. 28, 1953, p. 285.
Methods for producing sand shell molds. (Concluded.) (E16)

540-E. A Special Report on European Foundry Progress. *Foundry,* v. 81, Sept. 1953, p. 102-117.
Foundry experts in Great Britain, France, Belgium, Italy, Netherlands, Germany and Switzerland outline activities and significant current developments in the foundry industry. Photographs. (E general)

541-E. Plastic Patterns Offer Advantages in Investment Casting. Roland S. Banister, *Foundry,* v. 81, Sept. 1953, p. 120-123.
Shows that plastic patterns can be made economically, eliminate hand work, decrease the number of patterns lost during dip coat and investing operations and give excellent as-cast finishes. Photographs. (E15)

542-E. Stress Relief of Gray Iron. Charles O. Burgess. *Foundry,* v. 81, Aug. 1953, p. 112-114; Sept. 1953, p. 128-131, 302-304.
Causes and ill effects resulting from internal stresses. Effect of temperature, holding time and cooling rate. Diagrams, graphs, photographs. 19 ref. (E general, J1, CI)

543-E. What is a Good Pattern? Walter Siebert. *Foundry,* v. 81, Sept. 1953, p. 132-133.
Construction of a large, complex pattern requires patternmaking skill and designer's co-operation. Photographs. (E17)

544-E. Formulas for Determining Weights of Castings. *Foundry,* v. 81, Sept. 1953, p. 265.
Data sheet. Diagrams.
(E general)

545-E. Drops Cupola Bottom Once a Week. Edwin Bremer. *Foundry,* v. 81, Sept. 1953, p. 124-125, 298, 300-301.
Practice in small foundry and advantages that have resulted. Diagrams. (E10)

546-E. Difficulties in the Production of Centrifugally-Cast Nickel-Bronze Bearing Shells. J. Taylor, Z. Stokowiec and R. S. Jackson. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 253-260.
Mechanism of bubble formation, gas porosity, location of defective metal, and changes in solidification process. Tables, graphs, micrographs. (E14, E25, Cu, Ni)

547-E. "Foundry" Development in the Textile Industry. B. Gale. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 265-273.
Foundry layout and procedure for casting parts for textile machinery. Photographs, diagram. (Concluded.) (E general, CI)

548-E. Part Needs Determine Best Casting Method. Davidlee Von Ludwig. *Iron Age,* v. 172, Sept. 3, 1953, p. 128-132.
Properties of parts affecting use of casting methods. Photographs. (E general)

549-E. Backyard Core Foundry Solves Binder Problems. Harold E. Bourassa. *Light Metal Age,* v. 11, Aug. 1953, p. 8-9, 35.
Use of urea-formaldehyde resins as foundry-core binders. Photographs. (E18)

550-E. Crucible Melting of Aluminium. *Light Metals,* v. 16, Sept. 1953, p. 306-307.
Melting procedure, factors affecting life of crucibles and flux attack. Photograph. (E10, Al)

551-E. Works Layout for Increased Productivity. *Machinery (London),* v. 83, Aug. 28, 1953, p. 439-448.
Die casting plant layout and operations. Diagram, photographs. (E13, Zn, Al)

552-E. A New "Lost-Wax" Precision Casting Foundry. *Machinery (London),* v. 83, Sept. 11, 1953, p. 507-514.
Equipment and procedures employed. Photographs. (E15)

553-E. Modern Aluminium and Stainless Steel Foundry. *Mechanical Handling,* v. 40, Sept. 1953, p. 416-418.
Flow layout, nonferrous machine molding section and the sand plant. Diagram, photographs.
(E18, E19, Al, SS)

554-E. Metal Casting Methods. V. Non-Ferrous Ingots. J. B. McIntyre. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 63-67.
Casting of nonferrous ingots, with particular reference to Cu-base alloys cast in chill molds. Photographs. 12 ref. (E16, Cu)

555-E. Productivity of Die-Casting Industry. *Metal Progress,* v. 64, Sept. 1953, p. 138, 140.

Digest of "Productivity Report", *Engineer,* Oct. 31, 1952, p. 569. Techniques, output, and labor relations in American and British industries. (E13)

556-E. Cast Furnace Resistors. *Metal Progress,* v. 64, Sept. 1953, p. 166, 168, 170.

Translated and condensed from "Heating Elements for Electric Resistance Furnaces Cast From Inoculated Alloys" (Russian), N. S. Kreshtshanovsky and A. D. Sventshansky, *Foundry Production,* 1952, no. 4, p. 6-11. Melting and alloying processes; use of various additions. (E10, B22, Cr, Ni)

557-E. British Views of Shell Molding. *Metal Progress,* v. 64, Aug. 1953, p. 188, 190, 192.

Digest of "Discussion on Shell Molding", by J. G. Pearce and W. B. Parkes, Research Report No. 347, *Journal of Research and Development.* See item 52-E, 1953. (E16)

558-E. The American Die Casting Industry. *Modern Metals,* v. 9, Sept. 1953, p. 62, 64, 66-68.

British report on American methods discusses finishing and inspection of Zn-alloy die castings. Reviews current research on die casting in U. S. Graphs. (E13, Zn)

559-E. Improved Die Coatings and Lubricants for Die Casting Brass and Other High Melting Alloys. *Precision Metal Molding,* v. 11, Sept. 1953, p. 52, 95-96.

Measures to prevent die checking. (E13)

560-E. Properties and Uses of Die Castings in the Low Melting Alloys. W. W. Richmond. *Precision Metal Molding,* v. 11, Sept. 1953, p. 58-59, 101-103.

Advantages and uses of Pb and Sn alloys. Tables, photographs. (E13, Pb, Sn)

561-E. Three Reasons to Use Investment Cast Parts. Wm. Bangser. *Precision Metal Molding,* v. 11, Sept. 1953, p. 67-68.

Factors favoring investment casting. Photographs. (E15, CI)

562-E. Comparison of Impregnants for Aluminum and Magnesium Castings. Carl F. Olson. *Precision Metal Molding,* v. 11, Sept. 1953, p. 114-121.

Advantages and properties of major sealants. Table, photographs. (E25, Al, Mg)

563-E. Shell Molding of Stainless Steel. Walter H. Dunn and Robert E. Day. *Product Engineering,* v. 24, Sept. 1953, p. 129-133.

Advantages, limitations and capabilities of process. Photographs, table, graph. (E16, SS)

564-E. Thin Walls Provide Strength for Magnesium Castings. Clarence H. Butler. *Western Metals,* v. 11, Aug. 1953, p. 56-58.

Casting design. Photographs, diagrams. (E17, Mg)

565-E. (Czechoslovakian.) **Chemical Hardening Molding Mixtures.** L. Petrzela. *Hutnické Listy,* v. 7, no. 10, Oct. 1952, p. 514-518; no. 11, Nov. 1952, p. 575-585.

Sand additives which harden quickly under effect of CO_2. (E18)

566-E. (Czechoslovakian.) **Malleable Iron.** P. Rys. *Hutnické Listy,* v. 7, no. 10, Oct. 1952, p. 519-522; no. 11, Nov. 1952, p. 585-588.

Production methods in USSR, U.S.A., England and Italy. Discusses heat treatment. Graphs. 13 ref. (E11, J23, CI)

567-E. (Dutch.) **The Effect of Foundry Sand Upon the Percentage of Defective Castings in the Foundry.** A. Schaer. *Metalen,* v. 8, no. 10, May 30, 1953, p. 216-218.

Types of defects caused by various sands. Suggestions for avoiding defects. (E18)

568-E. (Dutch.) **Centrifugal Casting in the Choice of the Correct Type of Bronze for a Particular Purpose.** *Metalen,* v. 8, no. 10, May 30, 1953, p. 219-222.

History of development for Pb bronze bearing metal. Special properties of centrifugally cast bronze. Micrographs. (E14, Cu, Pb)

569-E. (French.) **Production of Copper Castings With Metallic Inserts.** *Fonderie,* 1953, July, no. 90, p. 3520-3522.

Prevention of various defects. Diagram. (E general, Cu)

570-E. (French.) **Gas and Inherent Blowholes in the Foundry.** Albert Portevin. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 445-464.

Metallurgical problems in ingots and castings. Tables, graphs, diagrams. (E25, Fe, Al, Cu, Si)

571-E. (German.) **Crucible Casting Process.** A. Beck and K. E. Mann. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 310-314.

Development, theory, technology and possibilities of improving the process. Photographs, diagram. 2 ref. (E10)

572-E. (German.) **Testing of Core-Sand Mixtures.** H. Derlon, and C. Rauh. *Giesserei,* v. 40, no. 16, Aug. 6, 1953, p. 404-409.

Water and binder contents, drying temperature, cooling time and natural variations in sand. Graphs. 18 ref. (E18)

573-E. (German.) **New Foundry Practices.** A. Obermüller. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 618-619.

Chill-cast molding (Croning Process) and chill casting in Al molds. (E16, Al)

574-E. (Hungarian.) **Hungarian Bentonites as Foundry Binding Agents.** Janos Barna. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 30-39.

History of rich Hungarian bentonite deposits. Composition and properties with special consideration of binding capacity in the crude state after heat treatment and at elevated temperatures. Tables, graphs. 21 ref. (E18)

575-E. (Hungarian.) **Production of Spheroid Graphite Cast Iron.** Istvan Karsay. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 25-30.

Possibilities for application of spheroid graphite cast iron and an implement for its handling, developed at the Hungarian Research Institute of the Iron Industry. Diagrams, micrographs, graphs. 11 ref. (E25, T general, CI)

576-E. (Hungarian.) **Casting of Iron Cylinders Using Metal From the Reverberatory Furnace.** Aladar Schleicher. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 45-48.

Difference in microscopic structure of Hungarian and foreign irons. Conditions necessary for the production of high-quality cylinders. 11 ref. (E general, Fe)

577-E. (Portuguese.) **Aluminum Alloys. The Technique of Sand Casting.** Clovis Bradaschia. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 47-72.

Effects of the most common alloying elements, properties of the alloys, processes in the electric furnace, sand casting, thermal treatment, and prevention of defects. Tables, photographs. 15 ref. (E11, Al)

578-E. (Portuguese.) **Clays and Bentonites in Casting.** Carlos Dias Brosch. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 73-108.

Use in the foundry. Tables, graphs. 3 ref. (E18)

579-E. (Swedish.) **Materials Handling in the Foundry.** G. Lindgren. *Gjuteriet,* v. 43, no. 7, July 1953, p. 119-125.

Economic aspects of foundry operation. Influence of planning on operational costs. Diagrams, tables. 3 ref. (E general, A5)

580-E. (German.) **Reaction of Solid Iron With Melts of Zinc Containing Aluminum Alloys.** K. Schneider and H. Kessler. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 608-610.

Formation of FeAl layer in composite castings. Photographs. 8 ref. (E25, Al, CI, CN, ZN)

581-E. Copper Oxides—Useful Tool in Casting Copper-Base Alloys. L. G. Klinker. *Foundry,* v. 81, Sept. 1953, p. 228, 230, 236.

Use of commercial copper oxide materials to control porosity. (E25, B22, Cu)

582-E. (Book.) **Advanced Casting Techniques and Processes. Summary and Final Report by Alloy Engineering and Casting Company for the Department of the Navy.** PB no. 109239. May 1950. 147 p. (Available from Library of Congress, Washington 25, D. C. Microfilm, $5.75. Photostat, $18.75.)

Reports work in casting of high-temperature alloys in ceramic molds. Explains and illustrates special equipment. (E12, EG-h)

583-E. An Analytical Study of the Die-Casting Process. Bruno Sachs. *ASTM Bulletin,* 1953, no. 192, p. 27-37.

Quality requirements, types of machines, and die-casting operations. Tables, diagrams, graphs. 20 ref. (E13)

584-E. Coke Quality and Carbon Pickup. C. R. Austin. *Foundry,* v. 81, Oct. 1953, p. 116-121, 234.

Tests intended to evaluate behavior of coke in the cupola, particularly with regard to its carburization power. Graphs, tables, micrographs, photograph. (E10, CI)

585-E. Determination of Feeding Systems. Robert A. Cech. *Foundry,* v. 81, Oct. 1953, p. 128-131.

Method employed to determine feeder requirements of steel castings which has proved successful in improving soundness and yield. Diagrams, graphs. 7 ref. (E23, CI)

586-E. Shell Molding. What Does It Cost? Walter W. Coleman. *Foundry,* v. 81, Oct. 1953, p. 156, 158, 190-192.

Typical layout and production and cost data for shell mold foundry requiring 6 to 8 men. Diagram, table, photographs. (E16, CI)

587-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Foundry Trade Journal,* v. 95, Sept. 17, 1953, p. 349-358.

Effects of C:Fe ratio, coke size and blast temperature. Controls necessary for production of gray

iron without pig iron. Graphs, diagrams, table. 5 ref. (To be continued.) (E10, CI)

588-E. Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Moulds. W. T. Pell-Walpole. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 381-388; disc., p. 388-389.

Details of work to determine effect of rate and temperature of pouring on bronze cast in molds of widely differing thermal characteristics. Graphs, tables. 11 ref. (E23, E25, Cu)

589-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 401-403; disc., p. 403-405.

Zone III reactions, hearth reactions, desulfurization, C control and ideal melting conditions. Graphs. 8 ref. (E10, E25)

590-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Foundry Trade Journal,* v. 95, Oct. 1, 1953, p. 413-422.

Principles of feeding. Apparatus and applications whereby gas pressures above atmospheric can be applied to freezing castings. Diagrams, photographs, tables. 8 ref. (To be continued.) (E23, CI)

591-E. Cast Iron for Enamelling. *Foundry Trade Journal,* v. 95, Oct. 1, 1953, p. 433-434.

Precautions in production of cast iron for enameling.
(E general, L27, CI)

592-E. Making Castings by Shell Mold and Investment Processes. Robert R. Dohrmann. *General Motors Engineering Journal,* v. 1, Sept.-Oct. 1953, p. 8-11.

Processes and advantages of each. Photographs. (E15, E16)

593-E. Use of Foam Plaster Process for Making Aluminum Alloy Torque Converter Castings. Kenneth B. Bly. *General Motors Engineering Journal,* v. 1, Sept.-Oct. 1953, p. 13-15.

Process providing wider range of core permeability by altering foam volume. Micrographs, photographs. 4 ref. (E16, Al)

594-E. Lost-Wax Precision Casting. *Machinery (London),* v. 83, Oct. 2, 1953, p. 651-656.

Preparation of molds, casting and sand reclamation plant. Photographs. (E15)

595-E. Fused Die Castings. Herbert Chase. *Materials & Methods,* v. 38, Oct. 1953, p. 119.

Procedure to obtain limited quantities of special shapes at low cost. Photograph. (E13)

596-E. Die-Castings in the Lock Industry. *Metal Industry,* v. 83, Sept. 18, 1953, p. 237-241.

Advantages of die-cast parts over parts made by simple casting. (E13)

597-E. Melting Practice for Investment Casting. Sam Tour. *Precision Metal Molding,* v. 11, Oct. 1953, p. 64-65, 91-94.

Control of raw materials and design of melting equipment. Photographs. (E15)

598-E. Die Lubricants. II. V. W. Smith. *Precision Metal Molding,* v. 11, Oct. 1953, p. 102-108.

Six lubricants for die casting dies. Photographs. (E13)

599-E. (French.) **Use of Scrap Iron in the Cupola Furnace.** Charles Dennery. *Fonderie,* 1953, Aug. no. 91, p. 3539-3555.

Thermal, physico-chemical, metallurgical and pure foundry aspects. Diagrams, graphs, photographs. 12 ref. (E10, Fe)

600-E. (French.) **Cupola Furnace and Superheating of the Cast Iron.** J. Pascal. *Métallurgie et la construction méchanique,* v. 85, no. 7, July 1953, p. 547-551; no. 8, Aug. 1953, p. 607-609.

Various types of furnaces and blast practices. Diagrams, graphs. (To be continued.) (E10, CI)

601-E. (French.) **Lubrication and Luting of Foundry Equipment Which Operates Under Pressure.** R. Grunberg. *Métallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 611, 613-614.

Selection of materials for specific applications. Diagram.
(E general, A5)

602-E. (German.) **Revisions of German Industrial Standard DIN 52401: "Testing of Foundry Sand".** H. Jungbluth. *Giesserei,* v. 40, no. 17, Aug. 20, 1953, p. 421-427.

Conforms closely with American standard. Graphs, tables. (E18, S22)

603-E. (German.) **Clylindrical Test Block for Determining the Properties of Compressed Molding Sand.** W. Götz. *Giesserei,* v. 40, no. 19, Sept. 1953, p. 469-477.

Test methods for determining strength and permeability. Photographs, tables, graphs. 12 ref. (E18)

604-E. (German.) **High-Test Cast Iron, Especially Cast Iron With Compact to Spherical Graphite Structure.** E. Piwowarsky. *Giesserei,* v. 40, no. 19 Sept. 1953, p. 477-482.

Production of high-test ductile cast iron without the use of Mg or Ce. Graph, micrographs. 17 ref. (E25, CI)

605-E. (German.) **Molds for Cast Iron Worm Shafts and Conveyor Screws.** *Giesserei,* v. 40, no. 19, Sept. 1953, p. 486-488.

Production of patterns and molds. Diagrams. (E17, CI)

606-E. Report of Committee A-3 on Cast Iron. J. S. Vanick, chairman. *American Society for Testing Materials, Preprint* no. 2, 1953, 6 p.

Proposed tentative methods of chill testing cast iron. Diagrams, tables. (E25, CI)

607-E. Production of Diesel-Engine Castings in Grey Iron. J. R. Charlton. *Institute of British Foundrymen, Paper* no. 1064, 1953, 9 p.

Methods adopted in the production of iron castings for diesel engines in a jobbing foundry. Photographs. (E11)

608-E. Survey of the Shell-Moulding Method of Casting Production. Bernard N. Ames. *Institute of British Foundrymen, Paper* no. 1058, 1953, 24 p.

Mechanics of process, metallurgical evaluations, mechanization, plant safety, dimensional tolerance, gating and heading, applications and economics. Photographs, graphs. 26 ref. (E16)

609-E. Pelleted Foundry Pitch. E. Brett Davies, T. F. N. Matthews, and G. Smart. *Institute of British Foundrymen, Paper* no. 1060, 1953, 5 p.

Use of pulverized coal-tar pitch as an additive to foundry sand. Photographs, graphs, tables. (E18)

610-E. Effects of Mould Resistance on Internal Stress in Sand Castings. R. N. Parkins and A. Cowan. *Institute of British Foundrymen, Paper* no. 1062, 7 p.

Measurements made on castings to determine whether surrounding mold material offers restraint to the contraction of the casting as it cools. Relation of restraint to high-temperature strength of the sand. Diagrams, tables. 5 ref. (E11, E25)

611-E. Inter-Relation of Combustion and Metallurgical Reactions in the Cupola. D. Fleming. *Institute of British Foundrymen, Paper* no. 1065, 1953, 13 p.

Experimental work. Diagrams, graphs. 13 ref. (E10, CI)

612-E. "Foundry" Development in the Textile Industry. B. Gale. *Institute of British Foundrymen, Paper* no. 1066, 1953, 15 p.

Foundry production of castings for the machinery employed to manufacture yarns. Types of machines, methods of production and metallurgical aspects. Photographs. (E general, CI)

613-E. Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Moulds. W. T. Pell-Walpole. *Institute of British Foundrymen, Paper* no. 1067, 1953, 8 p.

Optimum pouring rates to suit various pouring conditions; their applications. Graphs, tables. 11 ref. (E23, Cu)

614-E. Difficulties in the Production of Centrifugally-Cast Nickel-Bronze Bearing Shells. J. Taylor, Z. Stokowiec and R. S. Jackson. *Institute of British Foundrymen, Paper* no. 1068, 1953, 9 p.

Mechanism of bubble formation, gas porosity, location of the defective metal, changes in solidification process and lead segregation. Tables, micrographs, diagrams. (E14, Ni, Cu)

615-E. Economic Utilization of Copper-Base Alloys. *Institute of British Foundrymen, Paper* no. 1069, 1953, 9 p.

Foundry and design factors. Tables. 6 ref. (E general, Cu)

616-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Institute of British Foundrymen, Paper* no. 1070, 1953, 18 p.

Principles established from previous work. Apparatus and applications. Results analyzed and conclusions drawn. Diagrams, micrographs, tables. 17 ref. (E23, ST)

617-E. Mould-Reaction in Aluminium-Alloy Castings. Marjorie Whitaker. *Institute of British Foundrymen, Paper* no. 1072, 1953, 9 p.

Investigation and results. Micrographs, tables. 13 ref. (E12, Al)

618-E. Organic Fillers Seal Defects in Metal Products. Helmut Thielsch. *Iron Age,* v. 172, Oct. 15, 1953, p. 118-121.

Two groups of organic fillers which permit salvaging rejected cast and welded parts. Tables, photographs. (E general, K general, A8)

619-E. Flow Properties of Foundry Sand. J. Gittus. *Iron & Steel,* v. 26, Oct. 1953, p. 475-478.

Implications of bond energy ratio with regard to green strength, shatter, loose flow and sieve tests. Graphs, photographs. 3 ref. (E18)

620-E. High Speed Production of Aluminum Gears by Die Casting. El-

liot L. Lewis. *Light Metal Age,* v. 11, Oct. 1953, p. 12-13, 28.

Equipment, process and applications. Photographs, table. (E13, Al)

621-E. Tin Founding. W. D. Arnot. *Mechanical World and Engineering Record,* v. 133, Oct. 1953, p. 446-448.

Development of process for making small castings in pure metal. Photographs. (E general, Sn)

622-E. Metal Casting Methods. VI. Die Casting and Investment Casting. J. B. McIntyre. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 123-129.

Methods of production of shaped castings by reference to slush, press, pressure die, gravity die and investment casting techniques. Photographs. 17 ref. (E13, E15)

623-E. Sealing Castings for Air Tightness. Gilbert C. Close. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 98-100.

How castings may be sealed in fabricating optical range finders. Photographs. (E25)

624-E. (German.) **Formation of Shrink Holes in Gray Cast Iron.** L. Hutter. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 454-457.

Hole formation depended on amount of eutectically separated graphite. Influence of silicon. Graphs, diagram. 8 ref. (E25, CI)

625-E. (German.) **Sand Testing by Swedish, German, and American Standards.** E. O. Lissell and O. Carlsson. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 445-454.

Tensile strength and permeability tests on samples from the three countries. Tables, graphs, diagrams. 11 ref. (E18)

626-E. (German.) **Production of Thin Walled Gray Cast Cylinders.** August Winter. *Giesserei,* v. 40, no. 18, Sept. 1953, p. 460-462.

Special attention to mixing of forming sand, charging and manner of gating. Diagrams. (E18, E22, CI)

627-E. (Hungarian.) **1952 Hungarian Experiments on the Production of Nodular Chilled Iron Rolls.** Bela Koros. *Ontöde,* v. 4, no. 5, May 1953, p. 97-103.

Core strength and wear resistance tests following magnesium additions. Tables, micrographs. 37 ref. (E25, Q23, Q9, Mg, CI)

628-E. High-Speed Control With Automatic Sand System. *American Foundryman,* v. 24, Nov. 1953, p. 36-39.

Equipment, plant layout and operating procedures. Photographs, diagram, table. (E18)

629-E. Planning a System for Materials Handling. K. Ennard and F. Lange. *American Foundryman,* v. 24, Nov. 1953, p. 42-47.

Equipment, plant layout and operating procedures including handling of raw materials, use of elevator for coke, charging of cupola, selection of core oven, and cooling methods for castings. Photographs, diagrams. (E general, A5)

630-E. Relation of Riser Range and Feeder Adequacy. I. William S. Pellini. *American Foundryman,* v. 24, Nov. 1953, p. 58-66.

Results of studies related to solidification of castings and to riser action. Diagrams, photographs, graphs, table. (To be concluded.) (E22)

631-E. The Die Casting Industry and Zinc. J. P. de Wet. *Canadian Mining Journal,* v. 74, Oct. 1953, p. 67-70.

History, present techniques, choice of alloy, terminology, contributions to industrial progress and suitability of zinc. Photographs. (E13, Zn)

632-E. Foundry Practice. V. Moulding and Coremaking. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 32, Oct. 1953, p. 231-232.

Discussion of skeleton patterns and strickles and sweeps. Takes up machine molding. Diagrams. (To be continued.) (E19, E21)

633-E. Graphite Spherulite Formation and Growth. Albert De Sy. *Foundry,* v. 81, Nov. 1953, p. 100-103, 210, 212, 218, 220.

Tentative complete theory and experimental results which give accurate details on mechanism of the above. Photographs, diagrams. 10 ref. (E25, CI)

634-E. Large Wood Patternmaking. M. J. Kellner and G. H. Gorsuch. *Foundry,* v. 81, Nov. 1953, p. 104, 282-285.

Classes of patterns and techniques in construction. Photographs. (E17)

635-E. Aluminum Foundry Has Three Strings for Its Bow. Edwin Bremer. *Foundry,* v. 81, Nov. 1953, p. 116-119, 290-291.

Equipment, plant layout and operating procedures. Photographs, diagrams. (E general, Al)

636-E. Automatic Control of Sand Moisture. Erle F. Ross. *Foundry,* v. 81, Nov. 1953, p. 120-123, 184.

Equipment and techniques resulting in improved quality and finish of castings. Photographs, diagrams. (E18)

637-E. Back-Up Material for Shell Molds. William O. Faxon. *Foundry,* v. 81, Nov. 1953, p. 178, 180, 183-184.

Considerations in choice of the above. Photograph, diagrams, graph. (E16)

638-E. Feeding of Steel Castings at Greater-Than-Atmospheric Pressures. Charles W. Briggs and Howard F. Taylor. *Foundry Trade Journal,* v. 95, Oct. 8, 1953, p. 447-454.

Reports no dependable improvement in efficiency from using increased pressures except in isolated cases where low positive pressures were found more beneficial than high. Diagrams, photographs. 9 ref. (E22, CI)

639-E. Cast-Iron Gutter Manufacture. *Foundry Trade Journal,* v. 95, Oct. 8, 1953, p. 457-459.

Equipment and process. Suggests its adaptation to production of other types of castings. Photographs. (E general, T26, CI)

640-E. Effect of Stripping Time on the Structure of Chill-Cast Irons. G. J. Shaw and V. Kondic. *Foundry Trade Journal,* v. 95, Oct. 15, 1953, p. 473-478.

Experiments showed that the shorter the time casting is in mold, the greater the likelihood of obtaining carbon in graphitic form throughout cross section of casting. Tables, photographs, diagram, graph. 6 ref. (E25, CI)

641-E. Coleman - Wallwork Shell Mould Making Machine. *Machinery (London),* v. 83, Oct. 9, 1953, p. 722-724.

Design and use. Photographs. (To be continued.) (E16)

642-E. Clamping Shell Moulds. *Machinery Lloyd (Overseas Ed.),* v. 25, Oct. 10, 1953, p. 85.

Problems of holding halves of molds together and giving them support when casting metal is poured. Photographs. (E16)

643-E. Thompson Products Adopts Low Cost, High-Quality Shell Mold Casting Process. William Achor. *Western Metals,* v. 11, Oct. 1953, p. 72-74.

Equipment, plant layout and procedures. Photographs. (E16)

644-E. (German.) **An Interesting Medium-Frequency Furnace for Melting Aluminium.** K.-H. Brokmeier. *Aluminium,* v. 29, no. 10, Oct. 1953, p. 417-423.

Design and results obtained. Diagrams, graphs, photographs. (E10, Al)

645-E. (German.) **Experiments With Hematite Pig Iron in Gray and Malleable Iron Foundries.** C. W. Pfannenschmidt. *Giesserei,* v. 40, no. 20, Oct. 1953, p. 505-510.

Behavior of gases in cast iron. Tables, photographs. 19 ref. (E10, CI)

646-E. (German.) **Oxygen and Nitrogen Contents of Hematite Pig Iron and the Finished Casting After Remelting in Different Furnaces.** J. Willems, R. Optiz, M. Paschke, and C. W. Pfannenschmidt. *Giesserei,* v. 40, no. 20, Oct. 1953, p. 510-516.

Melting reduces oxygen content and increases the nitrogen content. Effects of different furnace types. Stresses importance of good melting practices. Tables, graphs, photographs. 23 ref. (E10, CI)

647-E. (German.) **Effect of the Composition of the Charge on Malleable Iron From the Cupola Furnace.** H. Siegel. *Giesserei,* v. 40, no. 20, Oct. 1953, p. 516-527.

Causes of defective castings. Photographs, tables, diagrams, graphs. (E10, CI)

648-E. (German.) **Inductively Heated Melting and Holding Furnaces.** E. Bertram. *Giesserei,* v. 40, no. 20, Oct. 1953, p. 527-533.

Advantages, designs, data on energy consumption and effect of operating time on energy consumption. Principles of crucible furnaces and possible application of low-frequency furnaces. Diagrams, tables, graphs. 3 ref. (E10)

649-E. (German.) **The Technique of Melting and Casting Under High Vacuum.** Otto Winkler. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1261-1267; disc., p. 1267-1268.

Design, operation and casting procedure. Effect on chemical composition of the metal. Diagrams, graph, table. 5 ref. (E10, C25, D8)

650-E. (Swedish.) **Some Experiences in Systematizing Molding of Large Castings.** Gunnar Aberg. *Gjuteriet,* v. 43, no. 8, Aug. 1953, p. 137-142.

Advantages of molding with cores and in cement sand. Various methods. Photographs. (E19)

651-E. (Book-German.) **(Defects of Cast Pieces. Causes and Prevention.) Fehlererscheinungen an Gusstücken. Ursachen und Vermeidung.** E. Knipp. 275 p. Verlag Stahleisen m.b.H., Dusseldorf, Germany.

Collection of practical observations and theoretical considerations for use by research and industry. (E25)

652-E. (Book—German.) **(Design of Pressure Cast Parts. Die and Pressure Casting.) Gestaltung von Druckgussteilen (Spritz- und Pressguss).** Gustav Lieby. 157 p. 1953. Franckh'sche Verlags-Handlung, Stuttgart, Germany.

Handbook on design of equipment, dies, molds, and parts. Procedures for casting low and high-melting, light and heavy metals. (E13)

SECTION F

PRIMARY MECHANICAL WORKING

1-F. Operation of a 12-In. Continuous Bar Mill. A. H. Griffiths. *Iron and Steel Engineer,* v. 29, Nov. 1952, p. 55-60; disc. p. 60.

Mill described has economical roll layout. All pass sizes are in one set of rolls except for the leader and finishing rolls. Diagrams and photographs. (F23, ST)

2-F. Production of Brass and Copper Wire. Benjamin H. McGar. *Wire and Wire Products,* v. 27, Nov. 1952, p. 1178-1179.

Processing of yellow and cartridge brasses. Improvements that may eliminate some intermediate steps. (F28, Cu)

3-F. What Are the Differences in Wire Drawing Lubricants? Leon Salz. *Wire and Wire Products,* v. 27, Nov. 1952, p. 1180-1184.

Type of metal, metallurgical and physical condition of rod, and mechanics of the operation. Classification of wire-drawing lubricants includes dry granulated soaps, soap-fat paste compositions, compounded oils, petroleum greases, and graphite. (F28)

4-F. Improved Lime Bath Performance by Recirculation. Jere Y. Heisler. *Wire and Wire Products,* v. 27, Nov. 1952, p. 1185-1187, 1235.

Some of the work done on lime coatings, particularly improvements which have been accomplished through installation of recirculating lime tanks in the rod and wire mills at Sparrows Point Plant of Bethlehem Steel Co. (F28, ST)

5-F. What's Ahead the Next Ten Years in Presswork and Forging. *American Machinist,* v. 96, Mid-Nov. 1952, p. D-D11.

Press work, forging, and extrusion. (F22. F24. G1)

6-F. Turbine Blades Forged in Mid-Air. Englebert Kirchner. *Aviation Age,* v. 18, Dec. 1952, p. 6-11.

Impactor developed by Chambersburg Engineering Co., Chambersburg, Pa. (F22, AY)

7-F. Less Waste, Higher Strength in Precision-Tapered Tube Parts. Graham B. Brown. *Aviation Age,* v. 18, Dec. 1952, p. 48-51.

Machine in which steel tubes are drawn through a die and over a mandrel to form aircraft parts. Photographs. (F26, ST)

8-F. Extruding Giants Coming Along. Irving Stone. *Aviation Week,* v. 57, Dec. 1, 1952, p. 42, 47-48.

Trends in large extrusion presses. Both nonferrous and ferrous metals are to be used but the latter to less extent. Photograph and diagrams. (F24)

9-F. Continuous Heating, Press Forging and Heat Treating of Automobile Crankshafts. *Industrial Heating,* v. 19, Nov. 1952, p. 2042-2046, 2048, 2050, 2052, 2054, 2056, 2058, 2184.

Production of high-quality automobile crankshaft by a continuous press-forging process at new Crankshaft Press Shop of the Chrysler Corp.'s Dodge Forge Plant. (F22, J general, ST)

10-F. Automation Cuts Forging Costs, Improves Quality. E. G. de Coriolis and J. D. Nesbitt. *Iron Age,* v. 170, Nov. 27, 1952, p. 106-109.

How faster forging machines, high-speed heating furnaces, and modern transfer equipment have made automation in the forge shop practical. Diagrams and photographs. (F22)

11-F. Speed-Dependent Variables in Cold Strip Rolling. R. B. Sims and D. F. Arthur. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 285-295.

Various ways in which mill speed may influence specific roll load and strip thickness in cold rolling. Steel

and copper strip were used with thicknesses on entry between 0.050 in. and 0.010 in., and a range of mill speeds between 10 and 300 ft. per min. Results show that variation of the coefficient of friction between rolls and strip is principal cause of load and thickness changes. Methods of automatic control suggested by Hessenberg and Sims will maintain gage to close tolerances over the speed range of the experimental mill. Tables and charts. 16 ref. (F23, Fe, Cu)

12-F. Aluminium Extrusion Billet Heating. *Metal Industry,* v. 81, Nov. 21, 1952, p. 407-408.

Magnethermic induction furnace, including automatic controls. (F21, Al)

13-F. Modern Brass Mill Turns Out Quality Products in Quantity. Arthur H. Allen. *Metal Progress,* v. 62, Nov. 1952, p. 110-112.

Description of Chase Brass & Copper Co. plants in Euclid, O., including melting, rolling, extrusion, welding, and annealing and pickling machines. (F23, C21, Cu)

14-F. Heavy Presses Challenge Industry. Alexander Zietlin. *Steel,* v. 131, Dec. 1, 1952, p. 76-79.

Introduction of new heavy hydraulic presses to American industry to fabricate a variety of structural members from ferrous and nonferrous metals—such as carbon and stainless steels, aluminum and copper, and their alloys. (F22, CN, SS, Al, Cu)

15-F. "Watch Charm" Mill Specializes on Small Diameter Buttweld Pipe. John D. Knox. *Steel,* v. 131, Dec. 1, 1952, p. 90, 93-95, 98-101.

Continuous buttweld mill built by the Sharon Tube Co., Sharon, Pa. (F26, ST)

16-F. Custom Mill Tackles Production Headaches. S. W. Baker. *Steel,* v. 131, Dec. 8, 1952, p. 94-97.

Special equipment and techniques used by American Silver Co., Flushing, N. Y., to roll small lot and special orders of almost any metal in thin strip form. (F23)

17-F. "Impacting"—A Revolutionary New Forging Process. Harold C. Hood. *Steel Processing,* v. 38, Nov. 1952, p. 553-555, 569.

New method for forming of materials recently developed by Chambersburg Engineering Co. Photographs and diagrams. (F22)

18-F. Die Sinking by Drop Forging. Part III. Forging Process. Adolph Rohrmann. *Steel Processing,* v. 38, Nov. 1952, p. 561-568, 578.

Methods and advantages. Photographs, diagrams, and charts. (F22, TS)

19-F. Forged Skin-Panels. Part 4. Third Phase Tests: Electronically-Heated Die: Die Finishing and Lubrication: Final Results. *Aircraft Production,* v. 14, Dec. 1952, p. 412-415.

The final stages of skin-panel forging. Die construction, lubrication, and results of test runs. Photographs and diagrams. (F22, Al, Mg)

20-F. Techniques and Problems in Large Extrusion Production. T. F. McCormick. *Iron Age,* v. 170, Dec. 11, 1952, p. 158-161.

Large extrusion press being installed at Alcoa's Lafayette, Ind., works. Production of solid extruded shapes 90 ft. long, 23 in. max. diameter and 2300 lb. in weight is being planned. Auxiliary equipment such as heat treating, preheating and reheating furnaces and straightening machines. (F24, Al)

21-F. Titanium Forging Experience Mounts. R. J. Bullock. *Steel,* v. 131, Dec. 15, 1952, p. 104-107.

Peculiarities of Ti in the forging process. Examples of successful forgings produced by Wyman Gordon Co., Worcester, Mass. (F22, Ti)

22-F. (French.) Different Stages in the Manufacture of Rolled Rail. M. Stammbach. *Circulaire d'Informations Techniques,* v. 9, no. 11, 1952, p. 1583-1596.

Processing of ingot to finished product, including comparisons between French and U. S. methods, main difference being that French use basic bessemer, and U. S. open-hearth steel. Diagrams, tables. (F23, T23, ST)

23-F. Britain's Latest Wheel Forge. *British Steelmaker,* v. 18, Dec. 1952, p. 680-689, 691.

Rolling and dishing, the furnace, firing by heavy fuel oil, control by signal lamp, hydraulic descaling machine, operation of forging press, hydraulic valves in foundations, 1000-ton punching press, operation of rolling mill, transfer to dishing mill, five rim chilling stations, and turntable powered by 10 hp. motor. Photographs. (F22, CN)

24-F. Forge for Continuous Production of Solid Railway Wheels and Disc Centers. *Engineering,* v. 174, Dec. 5, 1952, p. 713-716.

General discussion of equipment at Tafford Park Steel Works, Manchester, England. (To be continued) (F22, CN)

25-F. Cast Refractories Replace Brick in Heating Furnaces. W. G.

Patton. *Iron Age,* v. 170, Dec. 18, 1952, p. 140-141.

Installation and preliminary testing of new cast refractory material to replace brick in a barrel-type forging furnace. (F1)

26-F. Investigation of the Piercing Process by Means of Model Wax Billets. J. L. Holmquist. *Iron and Steel Engineer,* v. 29, Dec. 1952, p. 53-65; disc., p. 65-68.

Experimental technique and apparatus used. Technique was applied only to the effect of the rate of reduction of section area on the magnitude and distribution of the deformations which occur in the piercing operation. Graphs, diagrams, and photographs. (F26)

27-F. Developments in Electrical Drives for Steel Mill Applications. W. R. Harris. *Iron and Steel Engineer,* v. 29, Dec. 1952, p. 69-73; disc., p. 73-74.

Revamp of the 56 in. four-stand tandem cold mill at the Sparrows Point plant of Bethlehem Steel to a five-stand tin-plate mill. Layout of the main drive equipment for 45-in. universal slabbing mill and drive layout of the 80-in. hot strip mill at the Fairless plant of U. S. Steel. Diagrams. (F23, ST)

28-F. Plate Qualities Required in Can Manufacturing. S. L. Flugge. *Iron and Steel Engineer,* v. 29, Dec. 1952, p. 127-129; disc. p. 129-130.

Future developments in sterilization and production methods which may allow lighter weight Sn plate stock to be used. (F23, L17, CN, Sn)

29-F. Aluminum Forgings "Coming of Age". Walter Rudolph. *Modern Industrial Press,* v. 14, Dec. 1952, p. 13-14, 16, 18.

Pictorial description of Aluminum Forge Div., Willys-Overland Motors, Inc., Erie, Pa. (F22, Al)

30-F. Cold Extrusion of Steel. *Modern Industrial Press,* v. 14, Dec. 1952, p. 40, 44, 46, 50, 52, 54.

Advantages and latest developments. (F24, ST)

31-F. The Use of Crystallography in the Development and Manufacture of Diamond Tools. G. E. Shubrooks, and H. P. Gifford. *Wire and Wire Products,* v. 27, Dec. 1952, p. 1288-1290.

Emphasizes the possibility of tripling life of diamond tools, including wire drawing dies, through a proper selection and orientation of the stones. Diagrams. (F28, C-b)

32-F. Silver Wire—Its Cold Working and Annealing. M. Baliki. *Wire and Wire Products,* v. 27, Dec. 1952, p. 1291-1296, 1313.

Experimental data and results. (F28, J23, Ag)

33-F. Pontiac Cold-Extrudes Rocket Projectiles. Ben C. Brosheer. *American Machinist,* v. 97, Jan. 5, 1953, p. 118-120.

One of the first successful applications of cold extrusion of steel parts on a production-line basis worked out by Pontiac production and tool engineers for producing 4.5-in. rocket nose pieces. Diagram and photograph. (F24, ST)

34-F. 75,000-Ton Throatless Forging Press Being Planned for Future Planes. Rupert LeGrand. *American Machinist,* v. 97, Jan. 5, 1953, p. 122-124.

Throatless press concept, optical alignment including press features, dies, nonforging uses, working the press, ease of manufacture, and economy of construction. (F22)

35-F. The Cause of Check Marks on Copper Wire. B. I. Ström and B. G. Waller. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 338-354.

An extensive study was made of tough pitch Cu. Size of surface defects, furnace atmosphere, and tensile stress were found to be important factors. (F28, Cu)

36-F. Modernization of an Old Draw-Bench for Cold Drawn Bars. Nils L. Gripenberg. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 355-360.

Measures accomplished in spite of severe shortages of equipment and funds. (F27, ST)

37-F. New Application of Old Principle Simplifies Forging. *Canadian Metals,* v. 15, Dec. 1952, p. 50-51.

Electro-forge machine using electrical resistance heating adaptable to low cost production of many small steel parts, from simple gear blanks to complex axle shafts. (F22, CN)

38-F. American Equipment Increases Britain's Steel Output. *Iron Age,* v. 170, Dec. 25, 1952, p. 74-77.

New continuous mills built at cost of $70,000,000 antiquating pack-mills of South Wales. Former output of 200-300 boxes of tinplate per week has been raised to 140,000 boxes per week. Photographs. (F23, CN)

39-F. Big Presses Tax Design Ingenuity. M. D. Stone. *Iron Age,* v. 171, Jan. 8, 1953, p. 99-103.

Design and mechanism of new hydraulic die forging and extrusion presses sponsored by the U. S. Air Force. (F22, F24)

40-F. Ingot Heat Conservation. I. Time Studies From Casting to Rolling. A. V. Brancker, J. Stringer, and L. H. W. Savage. **II. Mould and Ingot**

Surface Temperatures. A. V. Brancker. III. Mould Temperature Measurements. R. T. Fowler and J. Stringer. *Iron & Steel,* v. 25, Dec. 12, 1952, p. 565-577.

Diagrams and tables. (F21, ST)

41-F. The Rolling of Precision Rounds in the U.S.A. R. Stewartson. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 419-426.

Analyses of factors enabling some American mills to produce high-quality rounds. Types of mills, billet preparation and heating, mechanical features, vertical precision rolls, and pass design. Tables and diagrams. (F23, AY)

42-F. Fabrication of Beryllium Metal. E. Creutz and D. Gurinsky. *Metal Progress,* v. 62, Dec. 1952, p. 82-84.

Extrusion, forging, and welding of Be. (F22, F24, K general, Be)

43-F. Scale on Steel. With Particular Reference to Drop Forgings. D. H. Lee-Bird. *Metal Treatment and Drop Forging,* v. 19, Dec. 1952, p. 533-536, 539.

Losses due to scale, scaling tests, effect on furnace bottoms, and descaling methods. Photographs and diagrams. (F22, R2, ST)

44-F. Extruding Aluminum in Giant Presses. T. F. McCormick. *Modern Metals,* v. 8, Dec. 1952, p. 54, 56-57.

Problems that could arise in the operation of 13,200-ton press now being installed in Alcoa's Lafayette Works. (F24, Al)

45-F. Fontana's Tin Mill Roll Shop. *Western Machinery and Steel World,* v. 43, Dec. 1952, p. 82-84.

Operation at above plant which has capacity of 200,000 tons of tin plate per year. Photographs. (F23, CN)

46-F. Huge Forgings in the Northwest. *Western Machinery and Steel World,* v. 43, Dec. 1952, p. 108-109.

Steel forging operations at Isaacson Iron Works of Seattle. Photographs. (F22, ST)

47-F. "Gargantua" Forge Press Forms 4-Ton Shaft. Robert T. Reinhardt. *Western Metals,* v. 10, Dec. 1952, p. 63.

(F22)

48-F. Forge for Continuous Production of Solid Railway Wheels and Disc Centres. (Concluded.) *Engineering,* v. 174, Dec. 12, 1952, p. 752-754.

Rolling mill, 2000-ton dishing press, rim-chilling machine, and motor and pump room. Photographs. (F22, F23, CN)

49-F. (Russian.) **Rolling of Metals With Minus Tolerances.** N. Gavrilenko and I. Kuzema. *Za Ekonomiiu Materialov,* Aug. 1952, p. 31-36.

Savings possible by this method. Data are tabulated. (F23)

50-F. Cold Extrusion Saves Time and Material in Making Rocket Elements. Joseph Geschelin. *Automotive Industries,* v. 108, Jan. 1, 1953, p. 62-65.

Steps involved in extruding SAE 1015 steel at Pontiac Motor Division, General Motors Corp. (F24, CN)

51-F. A Note on the Back-Pull Factor in Strip-Drawing. R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, Jan. 1953, p. 142-145.

Theoretical analyses which is compared with previous theories. 7 ref. (F23)

52-F. Forging of Arc-Melted Chromium. H. L. Gilbert, H. A. Johansen, and R. G. Nelson. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 63-65.

Hydrogen-reduced electrolytic Cr powder may be arc-melted to prepare ingots for forging, rolling, or swaging to desired form. Finished forms exhibit ductility at considerably lower temperature than heretofore described. 9 ref. Photographs. (F22, Cr)

53-F. General Facts About the 35,000 and 25,000-Ton Forging Presses. E. A. Irwin. *Machine and Tool Blue Book,* v. 49, Jan. 1953, p. 170-174, 176.

Presses being built for production of Al and Mg forgings for the aircraft industry. (F22, Al, Mg)

54-F. Separation of Shell Billets by the Shear-Fracture Method. W. C. Tucker. *Machine and Tool Blue Book,* v. 49, Jan. 1953, p. 178-180, 182, 184, 186.

Merits of using the method and characteristics to be watched for. Discussion follows U. S. Army and Navy Ordnance specifications. Diagrams and photographs. (F29, ST)

55-F. Bronx Continuous Tube Forming and Welding Machine. *Machinery* (London), v. 82, Jan. 2, 1953, p. 27-29.

Machine which continuously welds ½ to 2½-in. tubing. (F26, CN)

56-F. Push-Button Controlled Wheel Forging and Rolling Plant. *Metallurgia,* v. 46, Dec. 1952, p. 275-280.

Addition of mechanical handling in the Trafford Park works of Taylor Bros. and Co. Ltd., which increased production and decreased man-hours. Photographs. (F22, F23)

57-F. Low Frequency Induction Heater. *Metallurgia,* v. 46, Dec. 1952, p. 281-282.

Use for heating light alloy billets (F21, Al, Mg)

58-F. Paper-Thin Metals. Availability Stimulates Design. Monroe Sherman.

Product Engineering, v. 24, Jan. 1953, p. 138-141.

Metals that can be rolled to 0.0005 in. and to tolerances as close as ±0.0001 in. are Al alloys, Cu-base alloys, ferrous metals, Ni-base alloys, high-temperature alloys, Mo, Ta, Ti, Zr, and precious metals. Rolling techniques. (F23)

59-F. Two Way Press Produces High Pressure Parts. *Steel,* v. 132, Jan. 12, 1953, p. 66-69.

Forging press which has main vertical ram of 5000 tons capacity and two horizontal rams of 2000 tons capacity. Techniques developed broaden field of shapes and patterns possible from steel and alloys. Photographs and diagrams. (F22, ST)

60-F. High-Pressure Pipework Fabrication. G. Poole. *Welding and Metal Fabrication,* v. 21, Jan. 1953, p. 13-16.

New plant, equipment, and fabrication procedures at Parsons & Co., Ltd., Heaton Works. Includes forming, heat treating, welding, and inspection. Photographs. (F26, J general, K general, CN)

61-F. (Book-German.) **(The Principles of the Rolling Process.) Grundlagen des Walzverfahrens.** H. Hoff and T. Dahl. 296 pages. Verlag Stahleisen m.b.H., Düsseldorf, Germany. 29.00 DM.

Theoretical principles involved in process of rolling metals. Although main emphasis is on steel, rolling of other metals and alloys is also dealt with. (F23, ST)

62-F. Rolls and Rolling. Part XXXIII. Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 41, Jan. 1953, p. 69-74.

Pass design standardization. Roll designs. (F23)

63-F. Brazed, Welded Tubing Coated for Corrosion Protection. Herbert Chase. *Iron Age,* v. 171, Jan. 29, 1953, p. 118-119.

Brazed and welded ferrous tubing, fortified with Cu, Sn, or Pb coatings for corrosion protection, is rapidly produced on a continuous basis at Rochester Products Div. of General Motors Corp., Rochester, N. Y. Starting as ribbons of steel, tubing is formed, brazed or welded, either dipped or electric plated, tested and coiled or cut to length. (F26, Fe, Cu, Sn, Pb)

64-F. Looping Rod Mill. Parts I, II, III, and IV. John H. Mort. *Metal Industry,* v. 81, Dec. 5, 1952, p. 445-447; Dec. 12, 1952, p. 461-462; Dec. 19, 1952, p. 481-483, Dec. 26, 1952, p. 501-504. (Concluded.)

Mill for drawing Cu wire. Raw material, finished products, and rolling techniques. Part II is a theoretical discussion on compiling a draft schedule. Parts III and IV present a theoretical analysis of loop forming. Diagrams and tables. (F27, F28, Cu)

65-F. Drop Hammer Forming Magnesium Sheet. F. L. Coenen. *Modern Metals,* v. 8, Jan. 1953, p. 33-34, 36-37.

Good results can be obtained in producing Mg parts in drop hammer if certain technical precautions and practices are observed. Recommendations of an engineer who has conducted considerable work on the process. (F22, Mg)

66-F. Manufacturing Rail Wheels. *Overseas Engineer,* v. 26, Jan. 1953, p. 203-204.

Procedure at Steel, Peech and Tozer works at Ickles for forging rail wheels from mild carbon, and alloy steel. (F22, CN, AY)

67-F. A Graphical Analysis of Power Consumption in Continuous Cold Reduction Mills. J. H. Mort. *Sheet Metal Industries,* v. 30, Jan. 1953, p. 57-72.

Theoretical discussion. Graphs and tables. (F23, CN)

68-F. Better Lubrication Boosts Production. A. D. Binz. *Steel,* v. 132, Jan. 26, 1953, p. 88, 90, 92.

Advantages of using Li base grease in hot strip mill. (F1)

69-F. (German.) **Flame Treating Ingots With Oxygen.** Egon Ritter and Heinz Didier. *Schweissen und Schneiden,* v. 4, Oct. 1952, p. 364-370.

Development and spread of the process; differences between acetylene cutting and flame treating; manipulation and procedure for use of the hand flame-treating apparatus; treating individual defects; oxygen pressure and use; fuel gas pressure and use; zone of heat influence, practicability; and flame treating in American installations. Photographs and ref. (F21, ST)

70-F. (French.) **High-Speed Gas Heating of Metallurgical Products.** M. Regis. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 161, 8 pages.

Recent developments in high-speed gas heating and its application in the heating of bars, tubes, strip, and billets. Graphs and diagrams. (F21)

71-F. (French.) **Some Considerations on Rolling Mill Pusher-Type Furnaces.** C. Calmes. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 183, 6 pages.

Operation and construction of the furnace. Method of detecting defects in order to reduce the useless consumption of heat. Graphs. (F21, F23)

72-F. The Extrusion of Steel. Equipment, Operation, Production. Jacques Séjournet. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 73-77; disc., p. 77-78.

Underlying principles of successful extrusion of steel, novel means now in use, and some possible future departures from present practices. Diagrams. (F24, ST)

73-F. Operation and Roll Design of the Gary Rail Mill. R. W. Dickson. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 93-99; disc., p. 99-101.

Equipment, layout, and procedure for rolling rails. (F23, CN)

74-F. Functioning of a Lubrication Organization in Heavy Rolling Mills. Robert R. Taylor. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 107-110; disc., p. 110-112.

Need and value of a well-organized lubrication organization in steel industry; emphasizes that this lubrication organization must function properly to be of value. (F23, CN)

75-F. The Drawing of Steel Wire at Elevated and Sub-Normal Temperatures. F. C. Thompson, J. B. Carroll, and E. Bevitt. *Journal of the Iron and Steel Institute,* v. 173; Jan. 1953, p. 36-51.

Hot drawing of mild steel wire and drawing at subnormal temperatures. Diagrams, graphs, and tables. 10 ref. (F28, CN)

76-F. Rehabilitation of a Slab Mill Without Loss in Production Time. A. Taylor. *Journal of the Iron and Steel Institute,* v. 173, Jan. 1953, p. 69-80.

Work consisted of electrification of the mill drive, installation of a new 50-ton overhead crane, conversion of a universal edge mill to a slab mill; and installation of much auxiliary plant, including ingot chair, ingoing and working tables, manipulating shears, outgoing run-out, crop handling arrangement, and mobile transfer table. Electrical equipment and civil engineering work involved in preparing new foundations. Diagrams. (F23)

77-F. Improved Manufacture of Large Alloy Steel Forgings. H. H. Burton. *Metal Progress,* v. 63, Jan. 1953, p. 125-129.

New steel compositions, ingot stage, forging practice, and heat treatment. Forgings described are made from 3% Cr-Mo steel. Tables and micrographs. (F22, AY)

78-F. Powerful Giant Will Reduce 18-Inch Tubes. Graham B. Brown. *Steel,* v. 132, Feb. 9, 1953, p. 90-91.

Machine which produces largest light-wall seamless tubing by cold reducing method. (F26)

79-F. Thompson Forging Operations Employ Induction Heating for Operating Economy. Paul Miller. *Western Metals,* v. 11, Jan. 1953, p. 58-60.

Results in closer controlled heating, more uniformity of parts being forged, and longer die life coupled with over-all operating economy and speed of production for forging operations of engine valves, bolts, and steel alloy rings for automotive and aircraft parts. Photographs. (F21, F22, ST)

80-F. Permanent Magnetic Properties in 18-8 Obtained by Cold Working. Samuel Storchheim. *Iron Age,* v. 171, Feb. 12, 1953, p. 140-142.

Cold reduction of annealed types 302 and 304 stainless steel wires which causes the austenitic matrix to transform to martensite. Wires, initially nonmagnetic, change partially to a ferromagnetic condition. Tables. (F28, P16, SS)

81-F. The Cold Reduction of Silicon-Steel and Stainless-Steel Strip. Alastair McLeod. *Sheet Metal Industries,* v. 30, Feb. 1953, p. 93-104.

Use of a 4-high reversing mill and up-to-date pickling line which includes a sodium-hydride bath for descaling stainless steel, and electric resistance decarburizing furnaces. Photographs. (F23, L12, AY, SS)

82-F. (Pamphlet.) **The Manufacture of Titanium Alloys.** Robert H. Dickinson and G. William Bauer. P. R. Mallory & Co., Inc. (Indiana), Report No. 6, Progress Report for June and July, 1951, Memo No. 8000-M-484, Aug. 3, 1951, 15 pages.

Forged properties, fabrication, and physical properties of Ti alloy. Micrographs and tables. (F22, Q general, Ti)

83-F. Electrical Equipment in Steel Plants. Parts I and II. A. F. Kenyon. *Blast Furnace and Steel Plant,* v. 41, Jan. 1953, p. 81-86; Feb. 1953, p. 192-197.

Recent development of improved control and regulating systems. Part 2: Several types of strip mills now in use. Photographs. (F23, ST)

84-F. Standards for Rough Chipping and Removing Welds. Dean Van Order. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 718-722; disc., p. 723-724.

Incentive plan for adequate weld removal. (F21)

85-F. Development of Electroformed Copper-Steel Wire. A. N. Gray. *Wire and Wire Products,* v. 28, Feb. 1953, p. 166-168, 218-219.

Traces development and functioning of apparatus to produce a satisfactory Cu-coated steel wire used for telephone drop wire. Diagrams and photographs. (F28, L18, CN, Cu)

86-F. (French.) Note on the Apparatus for Hot Rolling Steel T-Bars at Sharp Angles. Louis Gascuel. *L'Ossature Métallique,* v. 17, Dec. 1952, p. 581-582.

Discusses apparatus with respect to diameter and temperature of the product rolled. Schematic drawing. (F23, ST)

87-F. Alloy Steels Processed in Special Furnaces at Crucible. Parts I and II. *Industrial Heating,* v. 20, Jan. 1953, p. 28-30, 32, 75-76, 78, 80, 82; Feb. 1953, p. 268-270, 275-276, 278, 280.

Deals primarily with various furnaces involved in production of sheet and strip at Midland Pa. plant of the Crucible Steel Co. of America. Specific use of each type of furnace. Part II: Annealing and pickling lines. Photographs and diagrams. (F21, J23, AY)

88-F. Drill Press Extrusion Cuts Costs of Thin-Wall Parts. W. N. Parker. *Iron Age,* v. 171, Mar. 5, 1953, p. 171-175.

Extrusion process for production of fragile, cylindrical parts looks like spinning but uses only a drill press and special mandrel and set of rollers. (F24)

89-F. Rolling of Thin Strip. M. D. Stone. *Iron and Steel Engineer,* v. 30, Feb. 1953, p. 61-73; disc., p. 73-74.

Reviews previous investigations and calculations. Presents method to provide rolling mill designers with an accurate and practical method of handling problem of thin strip rolling. Graphs and tables. 22 ref. (F23)

90-F. Automatic Control for Regenerative Soaking Pits. Griffin L. Isaacs. *Iron and Steel Engineer,* v. 30, Feb. 1953, p. 75-78; disc., p. 78-82.

Automatic control on the pits improves quality; reduces maintenance and scale loss; and increases production. Diagrams. (F1)

91-F. Developments in the Rolling of Broad Flange Beams. G. Barry Thomas. *Journal of the Iron and Steel Institute,* v. 173, Feb. 1953, p. 113-118.

Details of roll design; methods of working in cogging and finishing mills; and construction of vertical roll housings to produce beams with parallel flanges. Diagrams and photographs. (F23)

92-F. The Electronic Control of Wire Drawing Machines. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 31, 1953, p. 94-95, 97.

Electronic voltage control applied to wiredrawing machines, thus eliminating use of contactors, relays, or switched resistors. (F28)

93-F. Centrifugally Cast Steel Tubing. What It Has to Offer. Where It Can Be Used. T. E. Rybka. *Materials & Methods,* v. 37, Feb. 1953, p. 104-107.

Compositions, sizes, properties, and applications. Tables and photographs. (F26, E14, CI)

94-F. Why the 250-lb. Copper Wirebar? *Metal Industry,* v. 82, Jan. 30, 1953, p. 83-85; Feb. 6, 1953, p. 101-102.

Suggests modifications in size and weight of rod and compares mill with others in rod rolling industry. 32 ref. (F27, Cu)

95-F. Small 2-High Reversing Mills Gain Favor. E. C. Peterson. *Steel,* v. 132, Mar. 9, 1953, p. 115, 118, 120, 123.

Advantages of small mill for rolling semifinished specialty steel products. Used for high alloy, stainless, and toolsteels. (F23, AY, SS, TS)

96-F. World's Largest Forging Press. Design and Analysis of a 50,000-Ton-Capacity Machine. F. T. Morrison and R. G. Sturm. *Mechanical Engineering,* v. 75, Mar. 1953, p. 191-193, 204.

Stress analysis of various parts to confirm adequacy of design. Photographs. (F22, Q25)

97-F. Continuous Press Forging System Uses Novel Furnaces. Arthur H. Allen. *Metal Progress,* v. 63, Feb. 1953, p. 90-93.

Procedure and equipment at Dodge Div., Chrysler Corp. Photographs. (F22, CN)

98-F. How National Tube Hot Extrudes Stainless Steel Tubing. D. I. Brown. *Iron Age,* v. 171, Mar. 19, 1953, p. 129-133.

Equipment, materials handling, and preparation of billets. Diagrams and photographs. (F26, SS)

99-F. Instrumentation Factors Affecting Production in Slab-Heating Furnaces. Carl M. Yaeger. *Instruments,* v. 26, Mar. 1953, p. 402-403 disc. p. 436-442.

Difficulties encountered which illustrate control problems. Solution, reasons for choice, and operational results. 8 ref. (F21)

100-F. Increasing Productivity of Fontana Blooming Mill. William A. Vogt. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 55-62; disc. p. 62-63.

Adaptation and modification of original equipment to increase production. Diagrams. (F23, ST)

101-F. Steel Defects Commonly Attributed to Heating. George Boal. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 64-67.

Reasons for some of the defects encountered in heating for rolling, particularly surface effects. Photographs. (F21, ST)

102-F. Mechanization of 12-In. Bar Mill. G. A. Henderson. *Iron and*

Steel Engineer, v. 30, Mar. 1953, p. 107-112; disc. p. 112-113.

Rebuilding of mill has increased efficiency and production. Diagrams, photographs, and tables. (F23)

103-F. Rebuilding of 12-In. Bar Mill. James O. Dague. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 114-121.

Rebuilding job; comparison of old mill to the new one. Diagrams and photographs. (F23)

104-F. Forgings and Drop-Forgings in Ti-Alloy 150A. Thos. Reynolds. *Light Metals,* v. 16, Mar. 1953, p. 91-93.

Some of the forging characteristics of Ti alloys. Photographs and micrographs. (F22, Ti)

105-F. The Potentialities of Large Forging Presses. G. W. Richards. *Machinery* (London), v. 82, Mar. 13, 1953, p. 497-505.

Possibilities of forging large light alloy parts. Dimensional tolerances, preparation of forging stock, and die blocks. Diagrams. (F22, Al, Mg)

106-F. Tension Considerations in Spooling Enameled Wire. Richard Bliss. *Wire and Wire Products,* v. 28, Mar. 1953, p. 257-262, 316-318.

Tension as related to material, dimensions, surface characteristics, distributor traverse rate, and allowable variation. (F28)

107-F. Unique Non-Rotating Single Block Coiler and Non-Rotating Multiple-Block Takeup for Continuous Wire Processes. N. M. Hudak. *Wire and Wire Products,* v. 28, Mar. 1953, p. 269-270.

Describes a universal coiler which offers means of solving present-day high-speed and large bundle requirements of the wire mill. Includes low carbon and nonferrous wire drawing operations. Photographs and diagrams. (F28, CN, EG-a)

108-F. Use Impact Forging for Tough-to-Machine Parts. L. R. Denny. *Iron Age,* v. 171, Apr. 2, 1953, p. 149-152.

Faster production, less material waste, and greater economy in machine time and labor are possible if Al alloys are impact forged. Diagrams and photographs. (F22, Al)

109-F. Impact Forging Can Save You Money. Frank J. Pesak. *Iron Age,* v. 171, Apr. 2, 1953, p. 153.

Impact forging of SAE 1010 and 1020 steels. (F22, CN)

110-F. Metallurgical Aspects of Large Pressings, Forgings, and Extrusions for Aircraft. Harold Schor. *Metal Progress,* v. 63, Mar. 1953, p. 111-114, 182, 184, 186.

Report of ASME symposium on use of large presses for Al. (F22, F24, G4, Al)

111-F. 35,000-Ton Press. (Review of "Bliss Heavy Forging Presses", from *Bliss News Letter,* No. 14, Nov. 1952.) *Metal Progress,* v. 63, Mar. 1953, p. 186, 188, 190.

General design of 25,000 and 35,000-ton forging presses ordered by the Air Force for pressing Al and Mg aircraft components. (F22, Al, Mg)

112-F. The Blacksmith's Art Speeds Our Plane Production. *Steel Horizons,* v. 15, no. 1, 1953, p. 20-21.

Techniques for the advancement of aircraft production place a major emphasis on heavy press forging. Photographs. (F22)

113-F. Special Tongs Facilitate Forging and Heat Treating Operations. *Steel Processing,* v. 39, Mar. 1953, p. 133-134.

Describes and illustrates tongs. (F22, J general)

114-F. The Theory of the Extrusion of Metals. R. Hill. "Strength & Testing of Materials", v. 6 Part I. Theoretical Papers on Strength and Deformation. 1952, p. 191-204.

Analysis of the two-dimensional problem of sheet extrusion. Direct and inverted extrusion. Extrusion pressure is evaluated in terms of the extrusion ratio and the compressive yield stress of the metal at the temperature and average speed of working. Diagrams. (F24)

115-F. (German.) **Investigation on Power and Work Required in Cold Forging of Various Steels.** Heinz D. Feldmann. *Stahl und Eisen,* v. 73, Jan. 29, 1953, p. 165-174.

Effects of pressing speeds and temperature on the power required. (F22, ST)

116-F. Restored Slabbing Mill Attains High Output. Scott Elliott. *Iron Age,* v. 171, Apr. 16, 1953, p. 118-120.

Rehabilitation of soaking pits, scale removal units, and manipulating equipment. Photographs. (F23)

117-F. Effect of Various Elements on Hot-Working Characteristics and Physical Properties of Fe-C Alloys. C. Travis Anderson, Robert W. Kimball, and Francis R. Cattoir. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 525-529.

Results obtained by the addition of varying amounts of S to Fe-C alloys. Tables and photographs. (F general, Q general, CN)

118-F. Modern Electrical Controls in a Continuous Aluminium Strip Mill.

P. E. Peck. *Metallurgia,* v. 47, Mar. 1953, p. 119-126.

Problems involved in controlling drives for mills and auxiliary lines. Photographs and diagrams. (F23, AI)

119-F. Stresses, Construction, Manufacture and Life of Cold-Flow Extrusion of Steel. Karl Sieber. *Draht* (English Ed.), Mar. 1953, p. 32-37.

Stresses in simple dies, reinforcing highly stressed extrusion dies, finishing working surfaces, life of reinforced flow press dies, and short-term life tests. Photographs, graphs, and diagrams. (F24, ST)

120-F. Forming Aluminum Sheet and Plate. E. V. Sharpnack, Jr. *American Machinist,* v. 97, Apr. 27, 1953, p. 165, 167.

Data sheet considering shearing, slitting, blanking, piercing, and necking. (F29, G2, Al)

121-F. Rolls and Rolling. Part XXXIV. Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 41, Apr. 1953, p. 399-407.

Diagonal pass rolling. Diagrams. (F23, CN)

122-F. Stainless Steel Tubes Extruded at U. S. Steel's Gary Plant. *Industrial Heating,* v. 20, Apr. 1953, p. 695-696, 698, 700.

Equipment and process. Photographs. (F26, SS)

123-F. How to Fabricate 430 Stainless. L. F. Spencer. *Iron Age,* v. 171, Apr. 23, 1953, p. 139-143.

How existing techniques and equipment should be altered. Photographs and diagrams. (F general, G general, SS)

124-F. Cold Extrusion Ready to Invade Metalworking Markets. D. I. Brown. *Iron Age,* v. 171, Apr. 23, 1953, p. 152-155.

Advantages of the process. Photographs and diagrams. (F24)

125-F. Baldwin Builds Large Split Die Forging Press. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 134.

Briefly describes and illustrates the new press. (F22)

126-F. Magnesium. Direct Extrusion of Alloys. John Alico. *Light Metal Age,* v. 11, Apr. 1953, p. 10-11, 22-23, 26.

Extrusion process for forming tubing and hollow shapes, extrusion ratio, butt discard, quenching, relation of speed and temperature, and application of products. 8 ref. (F24, J26, Mg)

127-F. Hot Extrusion of Metal at National Tube Division of U. S. Steel Corp. *Modern Industrial Press,* v. 15, Apr. 1953, p. 6, 8.

Equipment and procedure for extruding stainless steel. Photographs. (F24, SS)

128-F. A Dramatic Continuous Press Forging Process. J. D. M. White. *Modern Industrial Press,* v. 15, Apr. 1953, p. 36, 40, 42, 44, 46.

Describes and illustrates process. (F22)

129-F. (Russian.) **Modeling of Hot and High-Speed Processes of Metal Working.** A. A. Il'iushin. *Prikladnaia Matematika i Mekhanika,* v. 16, June-Aug. 1952, p. 385-398.

Laws of similarity. Concludes that ratio of characteristic time to the square of linear dimension must be the same in the model as in actual production. 2 ref. (F general)

130-F. An Examination of Modern Theories of Rolling in the Light of Rolling Mill Practice. N. H. Polakowski. *Sheet Metal Industries,* v. 30, Mar. 1953, p. 237-243.

Speed correspondence between stands of tandem mills, loss of synchronism between stand motors at reduced speed, and methods of automatically maintaining constant speed ratio between tandem mill stands by means of IR-drop compensation. Diagrams and tables. 8 ref. (F23, S18)

131-F. Large Forging-Presses. G. W. Richards. *Aircraft Production,* v. 15, May 1953, p. 154-161.

Specific pressures, dimensional tolerances, distortion, preparation of forging stock, die blocks, and design analysis. Diagrams and photographs. (F22)

132-F. Strip Mill Does a Quick Change. *Steel,* v. 132, May 18, 1953, p. 100, 102.

Replacement of a continuous mill with another of larger size in 15 days. (F23)

133-F. (German.) **Some Investigation on Wire Pulling.** F. C. Thompson. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 2, Feb. 1953, p. 21-31.

Determinations of tractive force and groove angle of traction were made through reasonable ranges. Metallic flow, friction, mechanical properties of the product and internal stress were examined. Data were mathematically analyzed. Photographs, graphs, diagrams, tables. 18 ref. (F28, Q general, Ni, Cu, Al, ST)

134-F. Cold Working of Metals. Joseph Geschelin. *Automotive Industries,* v. 108, Apr. 15, 1953, p. 32-35, 130.

Various production processes for reducing waste and improving quality. Photographs. (F general, G general, CN, Cu)

135-F. Rolls and Their Maintenance in the Non-Ferrous Metals Industry. *Institute of Metals, Journal,* v. 81, 1953, *Institute of Metals, Bulletin,* v. 1, May 1953, p. 199-202.

Roll usage, manufacture, servicing, and maintenance. Rolling of Cu, Zn, Ni, and Ni alloys. (F23, Cu, Zn, Ni)

136-F. Selecting Forging Alloys. Lester Spencer, *Product Engineering,* v. 24, May 1953, p. 202-207.

Characteristics of carbon steels, medium-alloy steels, high-alloy materials, high-temperature alloys, and nonferrous materials. Defines heat treatments commonly used on forgings. Tables. (F22, J general, CN, AY, SG-h, EG-a)

137-F. (German.) **Reasons for Surface Defects in Hot Working Plain Carbon Steel.** Herbert Buchholtz and Richard Pusch. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 204-212.

Describes scaling tests in different furnace atmospheres using specimens taken from pickled rounds representing heats from several steel plants. (F21, CN)

138-F. (German.) **Economic Significance of a Full-Continuous Mill Train for Rolling Semifinished Steel Products.** Helmut Weiss. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 272-279.

Compares rolling schedules, yields, output, and costs of rolling with 3-stand, 3-high mill train. Graphs, tables. (F23, ST)

139-F. Soaking-Pit Instrumentation. F. R. Pullen. *Instruments,* v. 26, May 1953, p. 724-726, 752, 754.

Important considerations in pit-furnace instrumentation such as fuel, pit-temperature, combustion, and pit-pressure control. Diagrams, photographs. (F21)

140-F. Forging World's Largest Air Compressor Discs Involves Special Problems. *Industrial Heating,* v. 20, May 1953, p. 854-856, 858, 860.

Forging 50-ton rotor disks. Photographs. (F22)

141-F. Costing and Estimating. Application in the Drop-Forging Industry. A. Taylor. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 223-227.

Importance of determining actual and probable costs. (F22, A6)

142-F. Steels for Cold Extrusion. Behaviour During Processing and Resultant Properties. D. V. Wilson. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 229-235, 242.

Includes steels from 0.1 to 0.4% C. Considers influence of microstructure, surface quality requirements, rate of straining, strain-aging, deformation, and stress relieving. Micrographs, graphs. (F24, Q general, CN)

143-F. Rolling Tapered Aluminum Isn't Easy. John H. Allen. *Steel,* v. 132, May 25, 1953, p. 118-119.

Shows that aircraft builders' needs are stimulating development of the art and production capacity. Discusses methods. (F23, Al)

144-F. (German.) **Design and Operation of Full-Continuous Mill Trains for Medium Strip and Their Relation to Wide Strip Rolling Mills.** Karl Wallmann. *Stahl und Eisen,* v. 73, no. 7, Mar. 26, 1953, p. 394-401.

Requirements demanded by processing industry on modern medium strip. Constructional features of medium strip as differing from wide strip mills. Tables, graphs. (F23)

145-F. (Book—German.) **(Steel Wire) Stahldraht.** A. Pomp. 335 p. Verlag Stahleisen, Düsseldorf, Germany. $9.50.

Starts with the wire rod, as it comes from the mill, and discusses effects of imperfections in the rod upon the quality of the finished wire. Describes and illustrates all stages of wiremaking and testing. Descriptions of pickling, hardening, straightening, polishing, and coating operations. (F28, ST)

146-F. Modern High Speed Side Trimming Lines. J. Raymond Erbe. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 514-519.

Developments for trimming strip metal which have resulted in motor regulation of winding reel and fast stopping. Photographs, graphs. (F29)

147-F. Pass Design for Hexagons. H. E. Muller. *Iron and Steel Engineer,* v. 30, May 1953, p. 55-63; disc., p. 63-64.

Shows that present high delivery speeds and production rates of the modern bar mill require both refinements in design and flexibility for size changes. Diagrams, graphs. (F23)

148-F. Processing, Properties, and Application of Cold Finished Carbon Steel Bars. J. F. Byers. *Iron and Steel Engineer,* v. 30, May 1953, p. 103-107; disc., p. 107.

Processing of, and properties and applications involved in production of cold drawn and turned carbon steel bar stock. Tables, Photographs. (F27, CN)

149-F. Mechanized Hot Scarfing. J. H. Zimmerman. *Iron and Steel Engineer,* v. 30, May 1953, p. 108-112; disc., p. 112-113.

Types and basic features of scarfing machines; installation recom-

mendations; improvements in process; and future developments. Photographs. (F21, CN, AY)

150-F. New Mill Rolls Uranium Bars on Production Basis. *Iron Age,* v. 171, May 28, 1953, p. 138.

Operation of the rolling mill. (F23, U)

151-F. Forged Fittings Made of Magnesium. An Important New Development. *Magnesium,* May 1953, p. 10-11.

Forged plumbing fittings from AZ 80 alloy slugs. Photographs. (F22, Mg)

152-F. Reducing Weight With Magnesium Plate. *Magnesium,* May 1953, p. 12-16.

Rolling the plate, mechanical properties, and applications. (F23, Q general, T general, Mg)

153-F. Electrically-Driven 42½-In. Cogging Mill. *Engineering,* v. 175, May 15, 1953, p. 633-635.

Electric power supply; excitation equipment; control system and circuits; operating conditions. (F23)

154-F. The Hot-Forging of Metals. H. K. Barton. *Machinery* (London), v. 82, June 12, 1953, p. 1109-1113.

Problems and solutions of impact forging. Diagrams. (F22)

155-F. Treatment of Edges of Fabricated Sheet Steel. Fred Rogers. *Modern Machine Shop,* v. 26, June 1953, p. 150-154, 156, 158.

Methods for finishing off rough edges of various thicknesses of sheet metal. Diagrams. (F29, CN)

156-F. Consett Development. New Blooming, Slabbing and Billet Mills. *Iron & Steel,* v. 26, May 1953, p. 162-168; June 1953, p. 309-314.

General layout, problems of civil engineering, and the new mills. Photographs, diagrams. (F23)

157-F. Wire Drawing Dies. B.I.S.R.A. Profiloscope for Checking Taper and Wear. *Iron & Steel,* v. 26, June 1953, p. 308-320.

Description. (F28, Q9)

158-F. Press-Extruded Forgings. L. M. Christensen. *Machine Design,* v. 25, July 1953, p. 124-127.

New process for producing Al precision forgings without draft. Photographs, diagrams. (F22, Al)

159-F. Forging of Titanium Requires Special Techniques. Gordon S. Tracy. *Machinery* (American), v. 59, June 1953, p. 202-205.

How forging Ti differs from Al or steel. Photographs. (F22, Ti, Al, ST)

160-F. Strip Mill With Designed-In Extras. *Steel,* v. 132, June 15, 1953, p. 102, 104, 107-108.

New 80-in. hot strip line. Flowsheet. (F23, ST)

161-F. Billet Heating Furnace Replaced in 16 Days. *Steel,* v. 132, sec. 1, June 22, 1953, p. 98, 100.

How new 2-zone reheating furnace was moved 44 ft. to permanent location in skelp mill train. (F21, ST)

162-F. Willys-Overland Shop Forges Million Pounds Monthly. *Steel Processing,* v. 39, June 1953, p. 273-274.

Plant and equipment. Photographs. (F22)

163-F. Fabrication of Zirconium. R. B. Gordon and W. J. Hurford. Paper from Zirconium and Zirconium Alloys. p. 131-145. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Consolidation of iodide Zr by nonfusion methods such as extrusion or hot compacting of crystal bar and pressing and sintering of Zr hydride. Present practices for hot working Zr ingots to primary shapes by forging, rolling, and extrusion. Information is given for cold rolling, drawing, swaging, forming, and machining. Tables. 28 ref. (F general, G general, Zr)

164-F. (French.) **Soaking Pit Hearths.** M. Paschal. *Circulaire d'Informations Techniques,* v. 10, no. 4, 1953, p. 647-653.

Cleaning hot and cold pits. Table. (F21)

165-F. (French.) **Modern Pit Furnaces at the Rombas Factory of the Sidelor Company.** M. Lesage. *Circulaire d'Informations Techniques,* v. 10, no. 4, 1953, p. 654-665.

Construction of soaking pits designed to burn a mixture of blast furnace and coke oven gas. Combustion products from each unit were analyzed. Tables, diagrams, graphs. (F21)

166-F. (German.) **Influence of Cuprous Oxide Content on Drawing Properties of Heated, Zinc-Electroplated Copper Wires.** F. Lihl. *Metall,* v. 7, nos. 9-10, May 1953, p. 324.

Preparation of brass-coated Cu wires. Photographs. (F28, Cu)

167-F. (German.) **Importance of Fuel Economy for Hot-Working Plants of Special Steel Works.** W. Riemann. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 721-727.

Functions of fuels department in plant. Classification of steels produced, optimum heating periods of various grades of product, temperature distribution at surface and in core, and temperature losses during withdrawal from the furnace. Photographs, graphs. 2 ref. (F21, ST)

168-F. (Book.) **The Wire Industry Encyclopaedic Handbook, 1953.** 448 p.

1953. The Wire Industry, Ltd., 33 Furnival St., London, E.C.4, England.

Provides useful technical information on wiredrawing, care of wire ropes, etc., and defines a large number of metallurgical terms and processes met within the industry. Includes buyers' guide to British firms. (F28)

169-F. Forge With All-Hydraulic Control. F. H. Towler and J. M. Towler. *American Machinist,* v. 97, July 6, 1953, p. 154-155.

Direct hydraulic control on a forging press installed in Sweden is reported to give almost instantaneous reversal with speeds up to 100 strokes per min. Diagrams. (F22)

170-F. New Method Speeds Calculations for Forging Dies. *Iron Age,* v. 172, July 2, 1953, p. 138-141.

Calculation of profiles of upsetting dies and visualization of material flow in forging operations simplified by a graphical process. Diagrams. (F22)

171-F. Design and Practices of the Semi-Continuous Strip Mill. Harold H. Warnock. *Iron and Steel Engineer,* v. 30, June 1953, p. 57-60; disc., p. 60-61.

Equipment. (F23)

172-F. The Reversing Hot Strip Mill. A. F. Kenyon. *Iron and Steel Engineer,* v. 30, June 1953, p. 62-70.

Typical mill installations, electrical equipment, and operation. Photographs. (F23)

173-F. Lubricants for Drawing Metals. Allen A. Brown. *Iron and Steel Engineer,* v. 30, June 1953, p. 96-100; disc., p. 100-104.

Fundamental requirments of lubricants and role played by the fatty oils and their derivatives as drawing lubricants or as components of such lubricants. (F1, G21)

174-F. Armco Starts Operation on New 80-In. Hot Strip Mill at Its Ashland Plant. *Iron and Steel Engineer,* v. 30, June 1953, p. 115-116.

Separate units of the mill. Photographs. (F23)

175-F. Titanium. Developments in Forging Methods. George T. Fraser. *Light Metal Age,* v. 11, June 1953, p. 14, 37.

Billet handling and annealing. (F22, J23, Ti)

176-F. Potentialities of Powerful Forging Presses. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 99, 101-104.

Development and application of large presses in Great Britain and U. S. Installation of a 12,000-ton press in a British company. Photographs. (F22)

177-F. Induction Heating of Aluminium Alloy Billets at Mains Frequencies. R. H. Barfield. *Metallurgia,* v. 47, June 1953, p. 305-306.

Possibilities and limitations of line frequencies. Factors governing design of equipment. (F21, J2, Al)

178-F. Giant Forgings for Giant Presses. *Metal Progress,* v. 63, June 1953, p. 82-83.

Forging a 145-ton column section for a 50,000-ton press. Pictorial story. (F22, CN)

179-F. Forming of Aluminum. *Metal Progress,* v. 63, June 1953, p. 166, 168, 170.

Digest of paper by E. V. Sharpnack, Jr. Previously abstracted from *American Machinist.* See item 120-F, 1953. (F29, G2, Al)

180-F. Planning Reduces Forging Costs. Less Wastage of Metal by Study of Forging Methods. F. Emanuel. *Metal Treatment and Drop Forging,* v. 20, June 1953, p. 253-255, 252.

Forging methods which allow use of metal ordinarily wasted. Diagrams. (F22)

181-F. New Non-Scaling Reheating Furnace. *Metal Treatment and Drop Forging,* v. 20, June 1953, p. 281-282.

Application in the drop forging industry. (F21)

182-F. Fabrication of Silver Wire. Fred M. Carter. *Wire and Wire Products,* v. 28, June 1953, p. 579-581, 630.

General description of working methods used in industry for the preparation of fine Ag wire of all sizes. Photographs. (F28, Ag)

183-F. Small Rolling Mills Designed With Heavy Machine Features. *Wire and Wire Products,* v. 28, June 1953, p. 586, 629-630.

Rolling mills of interest to manufacturers of jewelry, slide fasteners, small machine parts, and other applications where close tolerances are an objective. (F23)

184-F. (German.) **Solved and Unsolved Problems of Mechanical Aspect of Blooming Mills.** Georg Leder. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 470-481.

Development of blooming mills in Germany. Advantage of passing ingot through rollers bottom end first. Innovations with roller-feed tables, step rollers, and geared devices. Photographs, diagrams. (F23, ST)

185-F. (German.) **Ordering and Acceptance of Soaking Pits.** Helmut Kallenbach. *Stahl und Eisen,* v. 73, no. 8, Apr. 8, 1953, p. 481-485.

Specific heat consumption and hourly output, heat absorption capacity, consumption during idling, heat recovery, control of furnace pressure, gas-air ratio, and temperature of furnace chamber. 4 ref. (F21)

186-F. The Manufacture of High-Duty Forged Pressure Vessels. J. E. Russell. *Alloy Metals Review,* v. 8, June 1953, p. 2-8.

Materials for and method of manufacture of the vessels. Diagrams, graph, photographs. (F22, CN, AY)

187-F. Manufacture of Pipe as Related to End Use. Richard Aubrey. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 197-213.

Continuous furnace, electric resistance, and submerged arc-weld processes. Photographs, micrographs. (F26, CN)

188-F. How Delco-Remy Cold-Forms Metals. Robert L. Kessler, W. A. Fletcher, and W. P. Bowman. *American Machinist,* v. 97, July 20, 1953, p. 135-142.

How high production rates result from sizing; flat and rotary swaging; coining; and extrusion. Diagrams, graphs, photographs. (F24, F25, G3)

189-F. Willys' Reactivated Aluminum Forge Plant. J. H. Pargeter. *Automotive Industries,* v. 109, July 1953, p. 50-53.

Press and hammer forging of simple and complex parts. Photographs. (F22, A1)

190-F. High Production Rate in Automatic Gas Equipment Heating Heavy Chain Bars for Offsetting. C. S. Thomas. *Industrial Heating,* v. 20, July 1953, p. 1276, 1278, 1280, 1282.

Process for offsetting the bars without cracking. Photographs. (F1, CN)

191-F. Tubing. New Mill Produces Fast. R. M. Lorz. *Iron Age,* v. 172, July 23, 1953, p. 53.

High-speed cold forming and induction welding. (F26, K6, Al, Mg, Cu, Ni, CN)

192-F. Here's Help in Fabricating Brittle Titanium. E. F. Hutchinson. *Iron Age,* v. 172, July 23, 1953, p. 111-115.

Drop and heavy contour die forging, welding, grinding, snagging, and design needs. Photographs, micrographs. (F22, G18, K general, Ti)

193-F. Precision Rolled Thin Strip Offers: 1. Close Tolerances. 2. Superior Surface Qualities. 3. Controlled Grain Size and Hardness. A. I. Nussbaum. *Materials & Methods,* v. 38, July 1953, p. 82-84. (F23)

194-F. Aluminum Cable Sheathing. K. S. Wyatt, *Modern Metals,* v. 9, July 1953, p. 66, 68, 70-71.

Draw-down, continuous extrusion, and strip methods of production. Advantages of replacing Pb with Al. Photograph. (F24, F26, Tl, Al)

195-F. New Mill Turns Out Bigger Copper-Clad Sandwiches. *Steel,* v. 133, July 13, 1953, p. 110, 112, 115.

Improved process reduces cost by cutting down the percentage of Cu alloy wasted in edge-trimming. Strip is three times as wide as it used to be. Photographs. (F29, Cu, ST)

196-F. Rod Mill Combines High Speed-Top Quality. *Steel,* v. 133, July 20, 1953, p. 90, 93.

Fundamental mill components are reorganized to serve as a 3-stand unit. Flowsheet. (F27)

197-F. Cold Extrusion of Steel. A Military Hero in Civilian Garb. Robert F. Huber. *Steel,* v. 133, July 27, 1953, p. 78-82, 109-110.

Advantages and limitations of process. Use with carbon steel. Photographs, diagrams. (F24, CN)

198-F. Larger Aircraft Components Now Forged in West by New 25,000 Pound Drop Hammer. Oscar W. Kaiser. *Western Metals,* v. 11, July 1953, p. 41-43.

Drop hammer used to forge Al parts. Photographs. (F22, Al)

199-F. Bethlehem Triples Wire Mill Capacity With New Machines and Furnaces. *Western Metals,* v. 11, July 1953, p. 60-61.

Describes plant layout and equipment. Photographs. (F28, J general)

200-F. (Swedish.) Calculation of Roll Force When Cold Rolling Strip. P. O. Strandell and A. Leufven. *Jernkontorets Annaler,* v. 137, no. 3, 1953, p. 100-114.

Diagrams are given for four grades of steel showing roll force coefficient as a function of thickness ratio in cold rolling strip. Tables, graphs. (F23, CN, SS)

201-F. Cemented Carbide Drawing Dies for Iron and Steel Wire. H. Wedl. *Draht,* (English Ed.) June 1953, p. 38-45.

Design, production, and cause of wear. Micrographs, diagrams, tables. 19 ref. (F28, T5, C-n)

202-F. New Blooming and Billet Mills at the Normanby Park Steel Works of John Lysaght's Scunthorpe Works Ltd. J. A. Peacock. "Conference on the Design of Rolling Mills." British Iron & Steel Research Assoc., London, p. 11-18; disc. p. 19-22.

Equipment, plant layout, and general lubrication system. Diagrams. (F23)

203-F. A Rod and Bar Mill at Guest Keen and Nettlefolds (South Wales) Ltd., Cardiff. G. A. Phipps. "Conference on the Design of Rolling Mills," British Iron & Steel Research

Assoc., London, p. 23-28; disc. p. 29-33.

Mill designed to meet a demand for steel free from rolling and surface defects. Diagrams. (F23)

204-F. The Light Section Mill at the Darlington Works of the Darlington and Simpson Rolling Mill Co. Ltd. W. French. "Conference on the Design of Rolling Mills," British Iron & Steel Research Assoc., London, p. 34-38; disc. p. 39-43.

Mill designed for precision rolling at high speed. (F23)

205-F. The New 42-Inch Slabbing Mill at Shotton. J. F. R. Jones. "Conference on the Design of Rolling Mills." British Iron & Steel Research Assoc., London, p. 3-5; disc. p. 6-10.

Mill designed to roll slabs of the full width of the hot strip, thus eliminating the disadvantages of cross rolling. Diagrams. (F23)

206-F. (Book.) **Conference on the Design of Rolling Mills.** 51 p. 1952. British Iron & Steel Research Assoc., 11 Park Lane, London, W.1, England.

Papers are abstracted separately. (F23)

207-F. The Magnet Amplifier in Control Circuits. R. W. Moore. *Iron and Steel Engineer,* v. 30, July 1953, p. 67-73.

Design of the amplifier, and its application in the rolling mill. Photographs, diagrams, graphs. (F23)

208-F. High Speed Mills and Their Application to Ferrous and Non-Ferrous Rolling. George Perrault, Jr. *Iron and Steel Engineer,* v. 30, July 1953, p. 83-89; disc., p. 89-91.

Typical mills show that increased speeds are justified. Diagrams, photographs. (F23, Fe, EG-a)

209-F. Rolling Mill Yield. Leo R. Silliman. *Iron and Steel Engineer,* v. 30, July 1953, p. 103-109; disc., p. 109-110.

How fundamental practices affect billet and bar yields. Photographs, graphs. (F23, CN, AY)

210-F. Forging Capacity of Hammers. *Metal Treatment and Drop Forging,* v. 20, July 1953, p. 310-312. (Translated and abridged from "The Use of Lead Cylinders to Determine the Energy of Forge Hammer Blows", K. Lange, *Werkstattstechnik und Maschinenbau,* v. 42, Nov. 1952, p. 464-468.)

Includes graphs. (F22)

211-F. German Experience Aids U. S. Artillery Shell Forgers. W. Trinks. *Steel Processing,* v. 39, July 1953, p. 340-344.

Causes of various defects in hot forged shells. How U. S. investigations are substantiated by German reports. Photographs. (F22, ST)

212-F. Baldwin Builds World's Largest Split Die Forging Press. *Welding Journal,* v. 32, July 1953, p. 622-624.

Specifications of the press. Photographs. (F22)

213-F. (French.) **Foil Rolling Mills at Rugles, and Finishing at Dijon Plant of the Wire and Rolling Mill Co. of Havre.** G. Francillard. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 147-153.

Production of Al foil in large widths containing very fine helio prints in five colors. Photographs. (F23, Al)

214-F. (German.) **Graphic Method for Design in Drawing Pipes.** A. Geleji and J. Schey. *Acta Technica Academiae Scientiarum Hungaricae,* v. 4, nos. 1-4, 1952, p. 347-363.

Graphic method by which pipe dimensions and drawing forces can be determined for each stage of the process. Drawings, graphs, nomograms. 6 ref. (F26)

215-F. (German.) **New Five-Pass, Nongliding Multiple Wiredrawing Machine With Back Tension.** *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 919-921.

Diagrams, photographs. (F28)

216-F. (German.) **Inductive Ingot Heating With Power-Supply Frequency.** Eduard K. L. Haffner. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 272-273.

Furnace for such heating. Photographs. (F21)

217-F. (Russian.) **Possibility of Extensive Use of Magnesium Forgings in Mechanical Engineering.** S. I. Gubkin, S. S. Volkov, and L. N. Moguchii. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952. p. 929-931.

Pecularities of the deformation of Mg and Mg alloys. Practical applications. 7 ref. (F22, Mg)

218-F. (Russian.) **Adaptation of New Economical Rolled Shapes.** V. Severdenko. *Za Ekonomiiu Materialov,* no. 3, Oct. 1952, p. 29-35.

Use of special rolled shapes in place of forgings. (F23, ST)

219-F. Mill Speeds Rolling of Thin Copper Strip. Edward C. Allen. *Iron Age,* v. 172, August 6, 1953, p. 143-145.

Machinery for rolling Cu and characteristics of finished product. Diagram, photographs. (F23, Cu)

220-F. (French.) **The Mill of Central Corporation for Light Alloys.** Marcel Lamourdedieu. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 101-107.

Operation and output of a rolling mill and extrusion plant at Issoire. Photographs, diagrams. (F23, F24, Al)

221-F. (French.) **Variation of Speed in Cold Strip Rolling.** *Métallurgie et la Construction Mécanique,* v. 85, no. 2, Feb. 1953, p. 120-121, 123.

With respect to controlled and independent rolling mills. Photographs. (F23)

222-F. (French.) **Theory and Practice of Automatic Looping in Rolling Mills.** Abel Beneteau. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 229-247.

Conditions under which a loop is formed in roll bars between two stands of rolls in a continuous mill. Diagrams. (F23)

223-F. (Hungarian.) **The Rolling of Magnesium and Its Alloys.** Laszlo Jakoby and Gyula Emod. *Aluminium,* v. 4, no. 7, July 1952, p. 145-151.

Melting and casting of Mg alloys suitable for rolling; effect and elimination of impurities; crystal structure; and effect of various heat treatments. Tables, graphs. 26 ref. (F23, C general, M26, J general, Mg)

224-F. Shell Forging and Heat Treating. Arthur Q. Smith. *Industrial Heating,* v. 20, Aug. 1953, p. 1514, 1516, 1518, 1520, 1522.

Furnaces for forging and heat treatment of shells. (F22, J general)

225-F. Lubrication in Metal Working. A. L. H. Perry. *Metallurgia,* v. 48, no. 285, July 1953, p. 3-10.

Types, nature and capacities of the main lubricants used in chipless forming and cutting operations. Discussion on testing and evaluating lubricants. Graphs, tables. (F1)

226-F. (Book.) **Tube Mill Practice.** 194 p. Association of Iron & Steel Engineers, Empire Bldg., Pittsburgh 22, Pa. $4.00.

Presents 23 articles compiled from *Iron and Steel Engineers.* Operating information and discussions. (F26)

227-F. Design Problems of Large Aluminum Forgings. C. W. Andrews. *Automotive Industries,* v. 109, Aug. 15, 1953, p. 32-33.

Cost factors to be considered when planning types of operations. (F22, Al)

228-F. New Hot Strip Mill at Pittsburgh Steel. J. C. Peth and F. E. Fairman, III. *Blast Furnace and Steel Plant,* v. 41, Aug. 1953, p. 926-938, 944.

Layout of semicontinuous hot strip mill. Diagrams, tables, graphs, photographs. (F23)

229-F. The Manufacture and Manipulation of Seamless Tubes. Accles and Pollock. *Engineering,* v. 176, Aug. 7, 1953, p. 161-165, 176.

Drawing process in detail. Photographs. (F26, CN, AY, SS)

230-F. New Mill Helps Boost Rod Output. John Delaney. *Iron Age,* v. 172, Aug. 27, 1953, p. 109-111.

Diamond and square rolling in roughing stands. Diagram, photograph. (F23, ST)

231-F. Replacements for Palm Oil in Cold Rolling Steel. Robert C. Williams. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 65-66; disc., p. 66-68.

Investigation for a substitute for palm oil. (F1, F23, ST)

232-F. Production of Aluminum Foil. W. B. Hackett. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 91-94.

Rolling mills and uses for Al foil. Photographs, diagrams, tables. (F23, T general, Al)

233-F. Pittsburgh Steel Starts New 66-In. Hot Strip Mill. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 118-120, 122, 124.

Describes and illustrates equipment. (F23)

234-F. Extrusion: The Newest Metal Working Method in Industry. T. F. McCormick. *Steel Processing,* v. 39, Aug. 1953, p. 379-382.

Process and equipment. Photograph, diagrams. (F24)

235-F. Performance of Ingot Heating Furnaces. S. A. Limpach and J. A. Reed. *Steel Processing,* v. 39, Aug. 1953, p. 392-398.

Report on typical performance of box-type ingot heating forge furnaces. Photographs, tables. (F21, ST)

236-F. The Extrusion of Brass Rod and Section. D. J. Broadley. *Australasian Engineer,* 1953, July, p. 67-73.

Development of equipment and technology. Production and preparation of billets. Diagrams, photographs. (F24, Cu)

237-F. Alcoa Gets Set for Big Forge Presses. *Aviation Week,* v. 59, Sept. 14, 1953, p. 28-30, 32, 35-36, 39.

Operating experiences with high-pressure forge machines. Photographs. (F22)

238-F. Rolls and Rolling. XXXV. Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1040-1047.

Design and production of groove rails. Diagrams, table. (F23)

239-F. Pittsburgh Steel Begins Hot Strip Mill Operation. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1053-1056.

Sixty-six inch semicontinuous hot strip mill, pickling line and finishing operations. Photographs. (F23)

240-F. The Temper Mill Drives at the Trostre Tinplate Works. *Engineer,* v. 196, Aug. 28, 1953, p. 265-268.

Cascade control exciter system, applied in conjunction with Ward-Leonard control for maintaining correct strip tension. (F23)

241-F. The Manufacture and Manipulation of Seamless Tubes. III. *Engineering,* v. 176, Aug. 21, 1953, p. 225-227.

Types of tubes made and the drawing process. Photographs. (F26)

242-F. Forging Techniques for Light Alloys. A. E. Favre. *Light Metal Age,* v. 11, Aug. 1953, p. 12-14.

Dimensional uniformity, pressure control, thin webs, deflection, draft angles, stock control, forgeability, design and machining. Diagrams, graph, photograph. (F22, Al, Mg)

243-F. Producing Precision Forgings on a deRoll Semi-Automatic Machine. *Machinery* (London), v. 83, Aug. 21, 1953, p. 339-346.

Constructional features of a semi-automatic precision hot forging machine. Photographs, diagrams. (F22)

244-F. Cold Extrusion of Steel. *Machinery* (London), v. 83, Sept. 18, 1953, p. 572-576.

Factors influencing process. Developments in process. Tables, graphs, diagrams. 6 ref. (F24, CN, AY)

245-F. Light-Alloy Forging. Design and Production Problems as Related to Heavy-Press Operations. A. E. Favre. *Mechanical Engineering,* v. 75, Sept. 1953, p. 693-697, 718.

General forging considerations, deflection studies, reducing unit pressures, design proportions, tolerances, die sinking, machining, residual stresses and distortion. Graphs, tables, diagrams. (F22, EG)

246-F. Panel Extrusions in Aircraft Structures. Howard Kastan. *Mechanical Engineering,* v. 75, Sept. 1953, p. 715-718.

Design and production development of tailored integrally stiffened sheet, stiffeners and skin made in one piece. Diagrams. 8 ref. (F24)

247-F. Cold Shaping of Steel by Compression Reaches Commercial Applications. Arthur H. Allen. *Metal Progress,* v. 64, Aug. 1953, p. 65-68.

Cold extrusion process and use for mass production of various shapes at Mullins Mfg. Corp. Photographs. (F24, CN)

248-F. Factors Influencing Cold Extrusion of Steel. H. J. Pessl, and H. H. Hauttmann. *Metal Progress,* v. 64, Aug. 1953, p. 69-73.

Bars were extruded from 25 carbon and low-alloy steels and tests made to determine effect of die angle and reduction of area. Mechanical properties of the bars were determined. Tables, photographs, graphs. (F24, Q general, ST)

249-F. Tools, Lubricants and Steels for Cold Extrusion. Tom Bishop. *Metal Progress,* v. 64, Aug. 1953, p. 74-77.

Characteristics and properties of die steels. Tools and lubricants. Tables, graphs. (F24, T5, AY)

250-F. Effect of Boron on the Overheating Temperature of Steel. J. Field. *Metal Progress,* v. 64, Aug. 1953, p. 78-83.

Tests compare the effect of two boron ferro-alloys on heating for hot work. Graph, tables, photographs. 7 ref. (F21, ST)

251-F. Cold Extrusion of Steel. William J. Meinel. *Ordnance,* v. 38, Sept.-Oct. 1953, p. 244-247.

Advances in techniques and applications to forming projectiles. Photographs. (F24, CN)

252-F. New Surface Treatment Method Facilitates the Cold Working of Stainless & Heat-Resistant Alloys. H. A. Holden. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 775-778, 819.

Various coatings used to assist in stainless steel tube and wire drawing. Table, photograph. (F1, F26, F28, SS)

253-F. Oxygen Cut-Offs in the Hot Mill. R. L. Deily. *Steel,* v. 133, Oct. 5, 1953, p. 98, 100.

Equipment and advantages of process. Photographs, diagram. (F29, ST)

254-F. Induction Forging Can Be Versatile. Frank T. Chesnut. *Steel,* v. 133, Sept. 7, 1953, p. 112-113.

Plant layout and operational procedure. Diagram, photographs. (F22, ST)

255-F. (German.) Rolling of Semifinished Product in Limited Steel Ingot Production and Scheduling of Rolled Products. Walter Kruse. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1101-1107.

Proportion of semifinished products in relation to total production of steel ingots in Germany. American and German rolling mills are compared relative to market conditions and rolling schedules. Graphs, diagrams, tables. 4 ref. (F23, ST)

256-F. (German-French.) Flame Straightening of Work Pieces. Richard Pfeiffer. *Zeitschrift für Schweiss-*

technik, v. 43, no. 6, June 1953, p. 106-109.
Methods, tools, tests and relations between heat, stresses and deformation. (To be continued.) (F29)

257-F. Some Aspects of the Hot-Extrusion and Piercing of Copper and Copper Alloy Billets for Tube Manufacture. I. Flow and Lubrication in Tube Extrusion. Clement Blazey. **II. Rotary Piercing.** Robert J. B. Pearson. *Australasian Engineer,* 1953, Aug. 7, p. 53-60.
Diagrams. 19 ref. (F24, F26, Cu)

258-F. Cold Extrusion of Steel. *Machinery (London),* v. 83, Oct. 2, 1953, p. 657-662.
Tool design and die steels. Diagrams, tables. 4 ref. (F24, TS)

259-F. Non-Ferrous Wire Production. *Metal Industry,* v. 83, Sept. 25, 1953, p. 255-258.
Wire rolling and drawing processes. Photographs. (F28)

260-F. A Nickel-Free Austenitic Steel for High-Strength Wire. H. O. McIntire and G. K. Manning. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1019, 1022-1026.
Development of an alloy low in scarce elements and suitable for drawing into nonmagnetic wire. Tables, graphs, photographs. (F28, AY)

261-F. Processing of Phosphor Bronze Wire. Earle W. Lovering. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1039-1041.
Common bronzes and their properties. Tables, graphs, photographs. (F28, Cu)

262-F. The Drawing of Shaped Steel Wire. Vito J. Vitelli. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1042-1043, 1046.
Continuous process. Photographs, diagrams. (F28, ST)

263-F. Components of Wire Drawing Lubricants. Leon Salz. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1056-1058, 1125.
Various components and their purposes. Photograph, table. (F28, F1)

264-F. Forging Tolerances. H. G. Conway. *Aircraft Production,* v. 25, Oct. 1953, p. 358-361.
Sources of error, tolerance standards and their application. Graphs, tables, diagrams. (F22)

265-F. Custom-Rolled Paper-Thin Metals for Aircraft. Monroe Snerman. *Aviation Age,* v. 20, Oct. 1953, p. 28-29.
Production and use of strip in thicknesses down to 0.0005 in. Photographs. (F23, T24)

266-F. Rolls and Rolling Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 41, Oct. 1953, p. 1176-1186.
Rolling of rail joint bars. Diagrams. (F23)

267-F. Aluminum Tubing. Small Diameter and Thin Walls Obtained by Extrusion. Gilbert C. Close. *Light Metal Age,* v. 11, Oct. 1953, p. 8-9, 28.
Equipment, plant layout and procedure. Photographs. (F26, Al)

268-F. Drop Forging Huge Titanium Aircraft Propellers. *Light Metal Age,* v. 11, Oct. 1953, p. 10.
Forging process and applications to aircraft industry. Photographs. (F22, Ti)

269-F. Flat-Die Forging of Cast-Titanium Ingots. J. F. Nelson. *Machinery,* v. 60, Oct. 1953, p. 164-168.
Experiences and recommendations of one company. Photographs. (F22, Ti)

270-F. Aluminum Rolling and Extrusion. *Metal Industry,* v. 83, Oct. 2, 1953, p. 275-278.
Equipment, plant layout and procedure. Photographs. (F23, F24, Al)

271-F. The Rolling of Metals and Alloys. I. Historical Development of the Rolling Mill. Eustace C. Larke. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 863-878.
History, early developments and recent advances made in flat rolling metals. Photographs, diagrams. 44 ref. (To be continued.) (F23)

272-F. New Seamless Mill Rolls Into Action. *Steel,* v. 133, Oct. 12, 1953, p. 97-99.
Plant layout and equipment. Photographs. (F26)

273-F. Evaluating Rolling Pressures in Hot and Cold Strip Mills. N. H. Polakowski. *Steel,* v. 133, Nov. 2, 1953, p. 96, 98, 100, 103-104.
Methods for prediction and direct measurement of roll separating forces under operating conditions. Tables, photographs, diagrams. 7 ref. (F23)

274-F. Hot Working Steels in the Forge and Their Treatment. W. Eilender and R. Mintrop. *Steel Processing,* v. 34, Oct. 1953, p. 509-515.
Survey of most frequently used hot forging steels and their properties. Factors which should be considered during heat treating. Table, graphs. (F22, J general, ST)

275-F. (German.) **Modern Drives and Controls in Heavy, Reversing Mill Trains and Cold-Rolling Mills.** Horst Nüsslin. *Stahl und Eisen,* v. 73, no. 18, Aug. 27, 1953, p. 1148-1155.
Improvements effected in rolling mills in recent years including motors used, twin drives, ground con-

nection controls and centrifugal couplings. Photographs, graphs, diagrams. 4 ref. (F23)

276-F. (German.) **Electronic and Magnetic Control Methods for Continuous and Reversible Hot-Rolling Mills.** Gustav Lemcke. *Stahl und Eisen,* v. 73, no. 18, Aug. 27, 1953, p. 1156-1162.

Methods of control of stand drives. Electronic time-lag relays for auxiliary drives. Diagrams, graphs, photographs. 11 ref. (F23)

277-F. (Hungarian.) **High-Strength Wrought Aluminum Alloys Without Nickel.** *Aluminium (Budapest),* v. 5, no. 5, May 1953, p. 97-103.

Investigations on the forging technology of Al-Mg-Si-Cu and Al-Mg-Zn-type alloys. Diagrams, graphs, micrographs. 14 ref. (F22, Al)

278-F. Mechanical Design and Operation of a Modern 46-In. High Lift Slabbing-Blooming Mill. J. H. Mayer. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 55-59; disc., p. 59-60.

Equipment, plant layout and operating procedures. Photographs, diagram. (F23, ST)

279-F. Electrical Design and Operation of a Modern 46-In. High Lift Slabbing-Blooming Mill. George A. Kaufman and Andrew W. Smith. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 61-66; disc., p. 66-68.

Equipment and plant layout. Photographs, diagrams, oscillograms. (F23, ST)

280-F. From Smelted Aluminum to Finished Sash With Presses. Walter Rudolph. *Modern Industrial Press,* v. 15, Oct. 1953, p. 36, 38, 40, 42.

Extrusion equipment, plant layout and operating procedure. Photographs. (F24, Al)

281-F. (German.) **Determining the Impact Energy of Forge Hammers.** *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 693-694.

Influence of preparation, treatment and size of sample. Graphs, photographs. 2 ref. (F22, Pb)

282-F. (German.) **The Formation of Surface Defects in the Hot-Working of Steel Due to Copper and Tin Impurities.** Kurt Born. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1268-1277; disc., p. 1277-1280.

High-temperature bending tests reveal surface cracking between 950 and 1150° C. Photographs, micrographs, graphs, tables. 14 ref. (F general, AY, Cu, Ni, Sn)

283-F. (Polish.) **Comparison of Calculation Methods for Roll Pressure in Cold Rolling of Strip.** K. Filasiewicz, Z. Wusatowski, and A. Galanty. *Prace Instytutow Hutnictwa,* v. 5, no. 2, 1953, p. 57-81.

Critical considerations of theoretical formulae and practical methods. Tables, graphs. 21 ref. (F23)

284-F. (Book—German.) **(Rolled Cast Iron.) Gewalztes Gusseisen.** Eugen Piwowarsky and Adalbert Wittmoser. 1949. 132 p. Verlag W. Girardet, Essen, Germany. 12.80 DM.

Hot and cold forming of cast iron. Effects of alloying metals. Photographs, drawings, tables. (F general, G general, CI)

SECTION G

SECONDARY MECHANICAL WORKING

1-G. Grinding Fixture Aids Die Manufacture. Rupert LeGrand. *American Machinist,* v. 96, Nov. 24, 1952, p. 134-135.

Steps in making dies for magazine tube forming. Photographs and diagrams. (G18, AY)

2-G. Curtiss-Wright Boosts Output With Machinability Data. Rupert Legrand. *American Machinist,* v. 96, Nov. 24, 1952, p. 141-148.

Reorganization at above plant to reduce costs and labor. Tabulates reduction in cutting times with carbide tooling. Diagrams and photographs illustrate equipment. Applications cited relate to forged cylinder barrel and crankcase sections—both hardened and tempered steel—for compound piston engines. (G17, C-n, ST)

3-G. What's Ahead the Next Ten Years in Tools and Tooling. *American Machinist,* v. 96, Mid-Nov. 1952, p. C-C15.

Carbide cutting tools, abrasives, jigs and fixtures, portable tools, setup accessories, small tools, automation, and press-shop automation. (G general, T6)

4-G. Six-Year Bibliography of Press-Working Articles in American Machinist. *American Machinist,* v. 96, Mid-Nov. 1952, p. D50, D52, D54.

Covers 1947-1952. (G1)

5-G. Stretch-Forming in a Hurry. David Morse. *Aviation Age,* v. 18, Dec. 1952, p. 38-42.

Machine which can stretch Al at less cost and more rapidly. Photographs and diagrams. (G9, Al)

6-G. Determination of the Quality of a Turned Surface From the Weight of Metal Removed During Turning. W. Leyensetter. *Engineers' Digest,* v. 13, Nov. 1952, p. 395-396.

Previously abstracted from original in *Zeitschrift des Vereines Deutscher Ingenieure,* item 508-G, 1952. (G17)

7-G. Fabricating and Painting Steel Partitions. Walter Rudolph. *Finish,* v. 9, Dec. 1952, p. 25-28.

Types of materials used for sound deadening, the cleaning process, roll-forming equipment, spot welding, painting doors, and special skids for doors. (G11, L12, L26, K3, CN)

8-G. Automatic Bar Pointer Improves Spring Production. W. G. Patton. *Iron Age,* v. 170, Nov. 27, 1952, p. 120-122.

Addition of a comparatively simple mechanical bar-handling and roll-feeding device has increased production and cut rejects of pointed steel bars used for front suspension coil springs in Chrysler-made cars. (G27, ST)

9-G. Manufacture of Aluminium-Sheathed Cable. *Light Metals,* v. 15, Nov. 1952, p. 357-360.

Advantages and production of Al-sheathed cable. Diagrams and illustrations. (G general, T1, Al)

10-G. High Strength Aluminum Impact Extrusions. M. P. Meinel. *Materials & Methods,* v. 36, Nov. 1952, p. 110-113.

Recent improvements in techniques of impact extruding which show that high-strength Al alloys can be worked by this method into a variety of shapes. Illustrations and diagrams. (G5, Al)

11-G. Bending of Aluminum Alloy Sheet. *Materials and Methods,* v. 36, Nov. 1952, p. 143.

Data sheet gives minimum allowable radii for bending Al alloy sheet depending on thickness, temper, and composition of material. (G6, Al)

12-G. "Hydro-Sizing" Proves Economical. Everett Jackman. *Modern Machine Shop,* v. 25, Dec. 1952, p. 170, 172, 174, 176.

Large aircraft manufacturer ef-

fectively utilizes above technique to finish-form externally-carried Al fuel tanks. (G8, Al)

13-G. A Leading Fabricator Enters the Magnesium Sheet Business. I. A. Campbell. *Modern Metals,* v. 8, Nov. 1952, p. 30-32, 34, 36-37.

Growth of Brooks & Perkins, Inc., Detroit, and its processes for forming Mg sheet. (G general, Mg)

14-G. Interview With Magnethermic's Logan. *Modern Metals,* v. 8, Nov. 1952, p. 54, 56-57.

J. A. Logan's observations on the Al fabricating business in Europe. (G general, Al)

15-G. Centerless Belt Grinds Extruded Stock. *Steel,* v. 131, Dec. 8, 1952, p. 102.

Method for fast grinding and rough finishing of bar and tube stock developed by Production Machine Co., Greenfield, Mass., and Behr-Manning Corp., Troy, N. Y., for removing die marks from high-alloy and stainless steel extrusions. (G18, SS, AY)

16-G. Cold Heading as a Method of Fabrication. Part I. Lester F. Spencer. *Steel Processing,* v. 38, Nov. 1952, p. 556-560, 569.

Advantages of using cold heading for production of articles from various ferrous and nonferrous metals. 11 ref. (G10)

17-G. New Atomic Secrets Will Be Revealed. *Welding Engineer,* v. 37, Dec. 1952, p. 48-49, 64.

Flame cutting, deburring, welding, and stress-relieving of steel magnet components of the "Cosmotron". (G22, K general, J1, CN)

18-G. Plant Employs Know-How for Custom-Built Trucks on Atom Gun Transport. Howard E. Jackson. *Western Metals,* v. 10, Nov. 1952, p. 31-34.

Forming, welding, and finishing processes used by Kenworth Motor Truck Corp., Seattle, Wash., for the atom gun transport.
(G general, K general, L general)

19-G. Salvage Cut 60% Using Hot-Rolled "T" Sections. Frank Charity. *Western Metals,* v. 10, Nov. 1952, p. 38-39.

Savings realized by using rolled shapes instead of bar stock at the J. C. Peacock Machine Co., Los Angeles, for fabrication of an aircraft "flap track." (G general, ST)

20-G. Abrasive Grinding Method Tapers Aircraft Skins. Paul J. Queyrel. *Western Metals,* v. 10, Nov. 1952, p. 49-51.

Method developed at Aircraft Industries Assn., Huntington Park, Calif. (G18, Al)

21-G. Appreciable Deformation of Work Piece Discovered in Research on the Orthogonal Cutting of Metal. E. G. Thomsen, J. T. Lapsely Jr., and R. C. Grassi. *Western Metals,* v. 10, Nov. 1952, p. 54-55.

Evidence is presented that deformation of workpiece in orthogonal cutting of metals is appreciable and may constitute major part of energy absorbed in metal cutting when depth of cut becomes small. Diagrams, charts, and micrographs give information obtained with SAE 1113 steel. (G17, CN)

22-G. (Russian.) **Influence of Surface Films on the Appearance of Seizing of Aluminum.** A. P. Semenov. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 357-359.

The effects of oxide layers and lubricants on Al sheet during deep drawing operations were studied. The optimum oxidizing time and temperature were determined. Oleic acid was found to be the best lubricant. (G21, Al)

23-G. Tube Manipulation. Part II. Bending and Butting. *Aircraft Production,* v. 14, Dec. 1952, p. 398-403.

Equipment and techniques for bending and butting tubes. (G6)

24-G. Low-Cost Methods Speed Die Construction. W. Curtis Miller. *American Machinist,* v. 96, Dec. 8, 1952, p. 93-96.

Production of large experimental dies using Zn alloys and expanding plastic patterns at Richard Bros. Div. of Allied Products Corp., Hillsdale, Mich. (G1, Zn)

25-G. Wet Belt Grinding Speeds Production of Extruded Cylindrical Stock. Dirck Olton and Hugh N. Dyer. *American Machinist,* v. 96, Dec. 8, 1952, p. 106-107.

Previously abstracted from *Steel;* see item 15-G, 1953. (G18, SS, AY)

26-G. Latest Improvements in Press Automation at Ford. Miles J. Rowan. *American Machinist,* v. 96, Dec. 8, 1952, p. 109-118.

Special designs of presses, dies, welders, blank loaders, and other equipment to permit maximum benefits of automation in Ford's new Buffalo plant. (G1)

27-G. Stainless Steel Aircraft Nacelles. J. A. Logan. *Automotive Industries,* v. 107, Dec. 1, 1952, p. 49, 108.

Design and methods of construction, particularly the stretch-forming and welding operations.
(G9, K general, SS)

28-G. Metal Cutting Developments. R. J. S. Pigott. *Lubrication Engineering,* v. 8, Dec. 1952, p. 289-290, 308, 310.

New method of using cutting fluids to cut metals. Comparison with previous procedures. (G17)

29-G. New Grinding and Machining Processes Promise Conservation of Diamonds. M. Bryan Baker. *Machine and Tool Blue Book,* v. 48, Dec. 1952, p. 219, 221-227.

"Electro-erosive", electro-sparking, electro-arcing, ultrasonic, and combined processes. (G17, G18)

30-G. Having Trouble With "430" Stainless? Richard E. Paret. *Machinery,* v. 59, Dec. 1952, p. 182-188.

Compares both of the grades and reviews changes in technique that are essential to successful conversion from 18-8 type stainless steels to straight Cr types including deep drawing, machining, and welding. Some mechanical properties are tabulated. (G4, G17, K general, Q general, SS)

31-G. How Jet-Engine Combustion Chambers Are Fabricated. Lawrence A. Prchal. *Machinery,* v. 59, Dec. 1952, p. 189-191.

Operations at Ryan Aeronautical Co., San Diego, including forming and welding of Inconel and stainless steel components.
(G general, K general, Ni, SS)

32-G. Corrugated Aluminium-Sheathed Cable. *Metallurgia,* v. 46, Nov. 1952, p. 237-240.

Process used by Pirelli-General Cable Works, Ltd., in which an oversize Al tube is welded around the cable and then corrugated so that its internal diameter is reduced to that of the cable. Mechanical properties are briefly discussed.
(G general, Q general, Al)

33-G. Contour Developer for Sheet Metal Products. Lew W. Goodwin. *Tool Engineer,* v. 29, Dec. 1952, p. 48-51.

Novel method of producing 3-dimensional plaster shapes for mock-ups, foundry patterns, and master tooling for contoured sheet products. Accuracy is insured by the simple and direct transfer of dimensions from loft to model. (G1, E17)

34-G. How to Increase Press Brake Efficiency. Harry M. Smithgall. *Tool Engineer,* v. 29, Dec. 1952, p. 57-59.

Procedures and precautions. (G1)

35-G. Tooling for Toys. G. F. Schumacher. *Tool Engineer,* v. 29, Dec. 1952, p. 63-69.

Tooling at the A. C. Gilbert Co., New Haven, Conn. for producing toys. Die casting, powder metallurgy, vacuum metalizing, automatic assembly and testing.
(G general, E13, H general, L23)

36-G. Metallurgical Aspects of Machinability of Steel. W. I. Pumphrey. *Welder,* v. 21, July-Sept. 1952, p. 63-68.

Provides welding engineers with concise and up-to-date information which affects many factors, including cost and productivity. (To be continued.) (G17, ST)

37-G. How Oak Ridge Machines Beryllium. J. M. Case and E. R. Watkins. *American Machinist,* v. 96, Dec. 22, 1952, p. 93-97.

Unusual precautions taken to protect workers from Be poisoning, plus the latest data on deep-hole drilling, milling, and other machining operations. (G17, A7, Be)

38-G. Stretch Forming Machine Shapes Extruded Aluminum Parts. *Iron Age,* v. 170, Dec. 18, 1952, p. 137-139.

A 60-ton stretch forming machine for Al alloy aircraft components, eliminates routing, blanking, or sawing operations on flat sheared stock. (G9, Al)

39-G. Production Costs Lowered With Pre-Coated Coil Stock. Arthur E. Uhleen. *Iron Age,* v. 170, Dec. 18, 1952, p. 145-147.

Use of precoated steel coil for stamping, piercing, intricate embossing, and deep and severe drawing. Savings and advantages.
(G3, G4, ST)

40-G. Calculations on the Influence of Friction and Die Geometry in Sheet Drawing. A. P. Green and R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, Oct. 1952, p. 31-36.

Calculations of drawing stress for sheet drawing for both smooth and rough wedge-shaped dies. Results are summarized in convenient empirical formulas. (G4)

41-G. Cold Strip Forming. Parts I and II. J. A. King *Sheet Metal Industries,* v. 29, Nov. 1952, p. 999-1002, 1008; Dec. 1952, p. 1092-1094.

Equipment and advantages of the process. Photographs and diagrams. (G1)

42-G. Deep Drawing Sheet Steel. E. M. H. Lips and F. J. H. Rolink. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 391-404.

Shows that drawability of metals can be predicted from tensile test data using reduction of area, yield strength, elongation, and the strain hardening parameter. Equations are derived and data charted. (G4)

43-G. Experts Analyze Heavy Press Problems. Irving Stone. *Aviation Week,* v. 58, Jan. 5, 1953, p. 20-21, 23-24, 27-28, 33-34, 38.

Advantages of integral construction and fabrication advances. Use of Al and other alloys. Diagrams and photographs. (G1, Al)

44-G. Colloidal Graphite and Metal Forming. *Canadian Metals,* v. 15, Dec. 1952, p. 52, 54.

Uses in metalworking industry. Properties are cited as excellent lubrication, high thermal and electrical conductivity, resistance to very high temperatures, and exceptional chemical stability towards most reagents. (G21, F1)

45-G. External Dust Control for a Pedestal Grinder. Parts I and II. W. H. White and W. B. Lawrie. *Foundry Trade Journal,* v. 93, Dec. 4, 1952, p. 641-645; Dec. 11, 1952, p. 673-682.

Experimental work which led to construction of a protype and dust estimations made on it. Movement of dust clouds, both with and without local exhaust ventilation was recorded. Part II: Various parts of the apparatus. Photographs, diagrams, and tables. (G18, A8)

46-G. New Auxiliary Tool Makes Manual Flame Cutting Easier. *Industry & Welding,* v. 26, Jan. 1953, p. 56-57.

Brief description. (G22)

47-G. Machining—Theory and Practice. K. G. Lewis and W. Milne. *Machinery,* (London), v. 81, Dec. 12, 1952, p. 1231-1236, 1247.

Essential characteristics of tool materials, wear of tungsten carbide tools, super high-speed metal cutting, methods of improving wear resistance, and "hot machining". 16 ref. (G17, TS)

48-G. Spun and Drawn Zinc Parts Have Many Applications. Ernest V. Gent. *Materials & Methods,* v. 36, Dec. 1952, p. 102-104.

Drawing, spinning, and finishing Zn articles. (G4, G13, L general, Zn)

49-G. Cooled Oil Jets For Cutting Tools Promise Increased Machinery Efficiency. Leo Walter. *South African Mining and Engineering Journal,* v. 63, pt. II, Nov. 29, 1952, p. 525, 527.

Procedure and advantages. Diagrams. (G21)

50-G. Cold Heading as a Method of Fabrication. Part II. Lester F. Spencer. *Steel Processing,* v. 38, Dec. 1952, p. 602-606, 630.

Advantages of cold heading for production of articles from various ferrous and nonferrous metals. 11 ref. (G10)

51-G. Cutting Forces and Temperatures When Milling With Carbide Cutters. H. Opitz and J. Kob. *Tool Engineer,* v. 30, Jan. 1953, p. 35-41.

Speed and feeds, design factors, test procedures using SAE 1010 and SAE 1035 steels, chip formation, economy of operation, and tool vibrations. Graphs and micrographs. 6 ref. (G17, CN)

52-G. Dust Collector, Maintenance "Musts" for Grinding Magnesium. Roy Nash. *Western Metals,* v. 10, Dec. 1952, p. 45-47.

Hazards involved and ways of preventing fires and accidents when grinding Mg. (G18, Mg)

53-G. Production Costs Minimized by Simplified Stamping Operation for Gold, Silver Jewelry Items. Howard E. Jackson. *Western Metals,* v. 10, Dec. 1952, p. 54-55.

Describes production of jewelry, souvenir spoons, and pins, rings, etc. at Northern Stamping & Manufacturing Co., Seattle, Wash. Photographs. (G3, Au, Ag)

54-G. Sheet Magnesium Problem Licked. *Aviation Week,* v. 58, Jan. 12, 1953, p. 40.

Low-temperature forming is made possible by use of Fiberglas mold and Neoprene blanket at low pressure. (G4, Mg)

55-G. Savings Claimed for New Carbide Grinding Procedure. *Machine and Tool Blue Book,* v. 49, Jan. 1953, p. 202-204, 206, 210-214.

Method developed by Precision Diamond Tool Co., Elgin, Ill. Results of tests conducted to determine efficiency. Photographs. (G18, C-n)

56-G. Huge Mechanical Press Speeds Production of Steel Cartridge Cases. H. G. Hron. *Machinery* (American), v. 59, Jan. 1953, p. 151-157.

Press which preforms processes of cupping and preheading simultaneously with only three subsequent draws required from SAE 1030 steel. Photographs. (G4, CN)

57-G. Unusual Die Produces Metal-and-Felt Washers. *Machinery* (American), v. 59, Jan. 1953, p. 208-210.

Die for producing brass washers. (G1, Cu)

58-G. (French.) Grinding in the Foundry. Marcel Hubert and Gilbert Gross. *Fonderie,* v. 81, Oct. 1952, p. 3130-3142.

Operation of grinding machines, properties of grinding tips, proper choice of grinders, and applications. (G18)

59-G. (German.) Precision Drilling, Grinding, Lapping, and Honing of Motor Parts in the Repair of Automotive Engines. A. Linek. *Metalloberfläche,* ser. A, v. 6, Nov. 1952, p. 164-170.

Machinery used and details of repair operations. Photographs. (G17, G18, G19)

60-G. (German.) Shape and Evaluation of Tool Life-Cutting Speed Curves. Franz Rapatz and Franz Motalik. *Stahl und Eisen,* v. 72, Dec. 4, 1952, p. 1583-1587.

Experimental and published data were used in evaluation. Relations

of tool life and machinability were established. Tables and charts. 13 ref. (G17, TS)

61-G. (Book-German.) **(Dictionary of the Technique of Grinding and Polishing.) Wörterbuch Der Schleif- und Poliertechnik.** B. Kleinschmidt. 96 pages. 1952. Technischer Verlag Herbert Cram, Berlin W35, Germany. 9.80 DM.

Translations of German-English and English-German grinding and polishing terms, some not yet found in other technical dictionaries. Illustrations with captions in both languages. (G18, G19)

62-G. Machinability Studies Compare Cast and Wrought Steels. *Iron Age,* v. 171, Jan. 1953, p. 102-104.

Tool life was used to measure machinability of seven cast steels prepared in 18 different heat treatments for turning. Comparison of 4130 Cr-Mo cast steel and 4140 wrought steel. Graphs. (G17, AY)

63-G. Impact Forming of Sheet Metal. *Modern Industrial Press,* v. 15, Jan. 1953, p. 24, 26, 28.

General discussion which includes steel, cast iron, stainless steel, and Zn dies for forming Al, stainless steel and Zn parts. Photographs. (G1, ST, CI, SS, Zn, Al)

64-G. New Press-Forming Techniques. John Starr. *Modern Industrial Press,* v. 15, Jan. 1953, p. 42, 44, 46.

Operation of stretch presses at North American Aviation, Inc., Los Angeles. (G9)

65-G. Cold Forming Titanium. J. W. Gulliksen. *Modern Metals,* v. 8, Jan. 1953, p. 48, 52.

Multi-stage drawing, light gage work, and forming rectangular and round parts. (G4, Ti)

66-G. Flame Beats Sugar for Lengthening Die Life. Joseph A. Goodbar. *American Machinist,* v. 97, Feb. 2, 1953, p. 122-123.

How high-silicon electrical grade steel is heated to reduce die wear in making motor laminations. Photographs. (G1, AY)

67-G. Metals Sawed by Friction. M. A. Bergson. *Aviation Age,* v. 19, Feb. 1953, p. 56-63.

Band sawing technique for cutting ferrous metals, by utilizing heat produced by friction. (G17, Fe)

68-G. Diminution of Plastic-Deformation Zone in the Machining of Metals Under the Action of Surface-Active Liquids. G. I. Epifanov and L. A. Shreiner. Henry Brutcher, Translation 2910, 5 pages.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 171-G, 1952. (G17, Q24, Al)

69-G. Effectiveness of Liquid Media in the Cutting of Metals as Function of Physico-Chemical Nature of Medium and Metal. N. A. Pleteneva and G. I. Epifanov. Henry Brutcher, Translation 2935, 7 pages, v. 77, 1951, p. 1051-1053.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 390-G, 1951. (G21)

70-G. Fabricating Integral Finned Tubing. *Canadian Metals,* v. 16, Jan. 1953, p. 44-45.

Fabrication of Cu, Cu-base alloys, and Al tubing by cold roll-forming process. (G11, Cu, Al)

71-G. New Grinding Technique Speeds Extruded Tube Production. *Canadian Metals,* v. 16, Jan. 1953, p. 46-47.

Technique employing two coated abrasive belts on a new centerless grinder is claimed to make possible a grinding rate of cylindrical stock faster than any other method of precision grinding. Developed for grinding stainless steel and other high-alloy tubes. (G19, SS)

72-G. Die Plate Calculation. Federico Strasser. *Modern Machine Shop,* v. 25, Feb. 1953, p. 174-176, 178.

Three steps, including formulas. Tables and diagrams. (G1, TS)

73-G. Cutting Fluid Reconditioning. *Screw Machine Engineering,* v. 14, Feb. 1953, p. 35-38.

Shown to be an important step in fluid conservation, tool life, and better part finishes. Photographs. (G21)

74-G. Speeds & Feeds for Counterboring Steel. *Screw Machine Engineering,* v. 14, Feb. 1953, p. 49-52.

Tabulated information and rules for calculating cutting speeds. (G17, ST)

75-G. Press Works in Two Directions. *Steel,* v. 132, Feb. 2, 1953, p. 122-124, 126.

Press which utilizes a horizontal ram working at both ends of the stroke, thus eliminating idle return. (G4)

76-G. Cutting Speed. Horizons Limited. Hans Ernst. *Steel,* v. 132, Feb. 9, 1953, p. 88-89.

Mathematical means for computing costs of cutting operations. (G17)

77-G. Gears Cut by Guided Flame. R. E. Orton. *Tool Engineer,* v. 30, Feb. 1953, p. 37-44.

Cutting of steel gears made possible by supplanting hand-guided torch with machine guiding wherein torches automatically trace out a faithful and accurate reproduction of a metal template. Photographs and diagrams. (G22, ST)

78-G. The Machinability of Cast Steels. Norman Zlatin, John F. Kahles, and Charles W. Briggs. *Tool Engineer,* v. 30, Feb. 1953, p. 59-67.

Steel microstructure, hardness, and tensile strength as related to tool life and power requirements. Covers carbon cast steel and several alloys including medium Mn, Cr-Mo, Ni-Cr-Mo, and Mn-Mo cast steel. (G17, CI)

79-G. Metallurgical Aspects of Machinability of Steel. Part II. (Concluded.) W. I. Pumphrey. *Welder,* v. 21, Oct.-Dec. 1952, p. 85-90.

Effect of chemical composition, heat treatment, metallographic structure, and mechanical properties. (G17, ST)

80-G. High-Zinc Brasses. *Copper & Brass Bulletin,* Feb. 1953, p. 8-9.

General discussion on brasses. Includes table of forming properties. (G general, Cu)

81-G. Convert to Belts for Lower Polishing Costs. J. J. Durnan. *Iron Age,* v. 171, Feb. 12, 1953, p. 133-135.

Conversion of polishing lathes from setup wheels to belt grinding by making use of backstand idlers. This gives every shop advantage of cooler, faster grinding at lower cost per piece. (G18, L10)

82-G. Titanium Can Be Deep Drawn. J. W. Gulliksen. *Iron Age,* v. 171, Feb. 12, 1953, p. 136-139.

Process of Worcester Pressed Steel Co. using tools designed for deep drawing steel cup-shaped parts. Reductions as high as 38% were obtained on 0.078-in. sheet in one draw. (G4, Ti)

83-G. Bending Aluminium Beams. *Metal Industry,* v. 82, Jan. 30, 1953, p. 86.

Machine developed for fabrication of aircraft structures. Photographs. (G6, Al)

84-G. Extrusion With Glass Lubrication. H. W. Perry. *Metal Industry,* v. 82, Jan. 30, 1953, p. 87-88.

Briefly describes use of glass as a die lubricant, a process primarily to assist drawing and forming of steel sections. Photographs. (G21)

85-G. Unusual Aircraft Components Produced by Stretch-Forming. T. A. Dickinson. *Sheet Metal Industries,* v. 30, Feb. 1953, p. 115-118.

Using new-type accessories and operational procedures made it possible to fabricate many unusual metal parts by means of stretch presses. Photographs and diagrams. (G9)

86-G. Right Wheel Cuts Diamond Consumption. John W. Ripple. *Steel,* v. 132, Feb. 16, 1953, p. 72-73.

Chipbreaker grinding in carbide cutter tips is an operation where wheel life is important. Width of wheel, coolant, and feeds have effect on life. Diagrams. (G18, C-n)

87-G. (Book.) **General Metals.** John L. Feirer. 257 pages. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N Y. $3.00.

Designed as a text in the field of metalworking for a modern industrial-arts program for junior or senior high school students. Some 22 to 45 pages each are devoted to such phases as wrought iron working, sheet metal, art metal and jewelry, and machine shop. Forging, heat treating, foundry and welding receive only 5 to 11 pages. (F general, G general)

88-G. (Book—French.) **Metal Drawing. Rules, Calculation.** B. Wassilieff. 76 pages. Dunod, 92 Rue Bonaparte, Paris 6, France. $1.25.

Principle of drawing, punch and die clearance and radii, lubrication, speeds, pressures, blank layout, and reductions in diameter. Practical examples of cylindrical, conical, hemispherical, and rectangular draws, together with methods of calculating necessary pressures and press sizes. (G4)

89-G. (Book—German.) **(Hardmetal Cutting Tools.) Die Hartmetallwerkzeuge in der spanabhebenden Formung.** J. Witthoff. 223 pages. Carl Hanser Verlag. Munich 27, Germany. 16 DM.

Use of sintered hard metal tools to cut ferrous metals, hard Mn steel, hard chill mold castings, weld deposits, Cu alloys, light metal alloys, plastics, glass, and wood. Machining of railroad wheels, milling gear wheels, drilling deep holes, and cutting threads. Indicates numerous ways of reducing production costs. (G17, Fe, Mn, Cu, Al, Mg)

90-G. (Book—German.) **(Thread Rolling. Cold Forming of Precision Threads and Spindles.) Gewindewalzen Kaltverformung von Präzisionsgewinden und Spindeln.** Heinz Apel. 355 pages. Carl Hanser Verlag, Munich 27, Germany. 24.80 DM.

Mathematical principles involved, and effect of temperature of materials to be rolled. Critically discusses foreign design as well as economy of thread cutting by this method. (G12)

91-G. Stretch-Forming. Part I. Forming Large Double-Curvature Skin-panels. The Avro Longitudinal Machine. Richard Wood. *Aircraft Production,* v. 15, Feb. 1953, p. 40-47.

Machine construction, forming dies, and forming technique. Graphs and diagrams. (G9)

92-G. Cadillac Teams CO_2 With Silicon Carbides to Grind Carbide Tools Better. T. N. Chambers and John Kwolek. *American Machinist,* v. 97, Feb. 16, 1953, p. 172-175.

Merits of using CO_2 as a coolant. Photographs. (G21, G18, C-n)

93-G. How GE Works Titanium. V. L. Coughlin. *American Machinist,* v. 97, Feb. 16, 1953, p. 176-181.

Summary of ideas developed for turning, forging, grinding, drilling, tapping, milling, and broaching. Photographs and diagrams. (G17, Ti)

94-G. Machinability of Cast Steels. IV, V, and VI. *American Machinist,* v. 97, Feb. 16, 1953, p. 189, 191, 193.

Extensive tabulated information which includes machining-data applications, power requirements, and machinability index. (G17, CI)

95-G. Gases Are Good Cutting Coolants. G. Pahlitzsch. *American Machinist,* v. 97, Feb. 16, 1953, p. 196-197.

Experiments showing advantages and disadvantages of CO_2 and N_2. Graphs. (G22)

96-G. Grinding-Machine Exhaust Systems. *Foundry Trade Journal,* v. 94, Feb. 5, 1953, p. 153-154.

Improvements in dust suppression on stand or pedestal grinding machines as used in steel and other foundries. Photographs and diagrams. (G18)

97-G. Creative Metal Stampings. J. D. M. White. *Modern Industrial Press,* v. 15, Feb. 1953, p. 13-14, 16, 20, 22, 26, 54.

Pictorial presentation. (G3)

98-G. Cylindrical Shells. An Experimental Investigation Into Redrawing. S. Y. Chung and H. W. Swift. *Iron & Steel,* v. 26, Feb. 1953, p. 63-66.

Experimental apparatus and procedure. Effects of first-stage drawing rates, inter-stage heat treatment, punch profile radius, first-stage radial clearance, redrawing ratio, material, temper, and blank thickness. Low-carbon rimming steel, 70-30 brass, and 99.0% Al were used. (G4, CN, Cu, Al)

99-G. Fabricating Stainless Steel Cooling and Holding Tanks. Howard E. Jackson. *Modern Industrial Press,* v. 15, Feb. 1953, p. 38, 42, 44, 46.

Fabrication of two basic types of cooling and holding bulk milk tanks from stainless steel. (G4, T29, SS)

100-G. Shot Peening to Reduce Porosity in Die Castings. Eugene F. Anderson. *Modern Metals,* v. 9, Feb. 1953, p. 46.

Use of shot-peening to eliminate porosity in castings which are subjected to pneumatic or hydraulic pressure. Photographs. (G23, E25, Al)

101-G. Shot Peening Coverage. (Extracts.) H. H. Miller and P. H. Flynn. *SAE Journal,* v. 61, Feb. 1953, p. 29-33.

Use of Straub and surface replica methods to provide accurately measured and easily controlled shot-peening coverage. Micrographs. (G23)

102-G. (German.) **Development and Modern State of Cleaning of Steel Parts by Oxygen-Flame Torch.** K. W. Sippell. *Schweissen und Schneiden,* v. 4, Nov. 1952, p. 381-393.

By flame cleaning, surface is loosened, reduced, or burned and can be removed easily by brushing. Apparatus, procedure, and examples. Photographs. 13 ref. (G22, CN)

103-G. Black-Bolt Heading Plant With Induction Heating. *Engineering,* v. 175, Feb. 13, 1953, p. 193-194.

How bolt-heading shop with high-frequency electric induction heating improves working conditions and gives closer control over heading process. Photographs. (G10)

104-G. Short Runs at Low Cost With Plastic Tooling. Walter G. Patton. *Iron Age,* v. 171, Feb. 19, 1953, p. 115-118.

Advantages of cast plastic stamping, forming, and drawing dies. Cost and production factors for automotive use are compared with metal dies. Tables. (G3, G4)

105-G. Hot Spinning Improves Workability of Titanium. Arnold S. Rose. *Iron Age,* v. 171, Feb. 19, 1953, p. 119-121.

Emphasizes need for localized heating of Ti to 1300° F. prior to spinning. (G13, Ti)

106-G. Small Parts Hot Headed in Cold-Heading Machines. H. Chase. *Iron Age,* v. 171, Feb. 19, 1953, p. 124-127.

A cold heading department which produces 1300 different parts on 125 cold headers and 26 boltmakers. Production of push rods is 31 per min. in a cold heading machine adapted for hot heading. Valve tappets of SAE 5120 cold drawn steel are made at the rate of 3000 per hr. (G10, AY)

107-G. How to Tap, Mill, and Broach Titanium. V. L. Coughlin. *Iron Age,* v. 171, Mar. 5, 1953, p. 186-188.

Control of property variations to obtain high strength, ductile, and machinable alloy material. Diagrams and photographs. (G17, Ti)

108-G. Evaluation of Drawing Lubricants. W. J. Wojtowicz. *Lubrication Engineering,* v. 9, Feb. 1953, p. 19-21, 41.

Discusses both oil and emulsion-type drawing compounds. Method of making preliminary assessments of these compounds, investigating lubricant variables, and providing information for intelligent formulation of new lubricants. (G21)

109-G. Powder-Cutting Eases Fabrication of Alloy Sheets for Minesweepers. Fred M. Burt. *Western Metals,* v. 11, Feb. 1953, p. 69-71.

Powder-cutting technique, which utilizes injection of a finely divided ferrous powder into cutting O_2 stream. Reaction between ferrous powder and O_2 generates an intense supplemental heat which melts refractory oxides as fast as they are formed. Manual arc welding is used for tack and finish welding of nonferrous special alloy parts. Photographs. (G22, K1, EG-a)

110-G. Stretch-Forming. Part II. Avro Practice in the Manipulation of Rolled and Extruded Section. Rotary Preforming-Machine. Richard Wood. *Aircraft Production,* v. 15, Mar. 1953, p. 82-89.

Prototype stretch-forming equipment built by Avro in 1937. Examples illustrate application of the technique to production of complex parts. Diagrams. (G9)

111-G. Complex Tube Bending. Peter Bell. *Canadian Metals,* v. 16, Feb. 1953, p. 44, 46.

Forming, inspection, and materials including Al, stainless steel, Cu, steel, and Ni alloy.
(G6, Al, SS, Cu, ST. Ni)

112-G. Some Aspects of Metal Removal. Gerald P. Grote. *Engineering Experiment Station News* (Ohio State University), v. 25, Feb. 1953, p. 3-8, 40-42.

Methods of chipping, grinding, oxidation, and melting for steel, gray iron, and nodular iron. Tables, graphs, and micrographs.
(G18, F21, ST, CI)

113-G. The Cutting of Metals With Sintered Alumina Tools. P. P. Groodov and M. P. Tzyganova. *Engineers' Digest,* v. 14, Feb. 1953, p. 59-61. (Translated and condensed from *Stanki i Instrument,* no. 4, 1952, p. 10-12.)

Results of tests on Al_2O_3-base nonmetallic cutting tool tips. Shows that small cross section of cut, absence of impact loads, and suitable tool designs are essential. Graphs and diagrams. (G17, T6, Al)

114-G. The Employment of Ceramic Materials for Cutting Metals. A. I. Isayev, N. N. Zorev, and L. K. Kootshma. *Engineers' Digest,* v. 14, Feb. 1953, p. 61-62. (Translated and condensed from *Stanki i Instrument,* no. 4, 1952, p. 12-14.)

Design of tools with detachable ceramic tips and replacement of carbide tips with ceramic ones under favorable circumstances. Graphs and diagrams. (G17, T6)

115-G. Machining. Theory and Practice. K. G. Lewis and W. Milne. *Machinery* (London), v. 82, Feb. 20, 1953, p. 353-360, 367.

Cutting fluid theory; factors influencing cooling requirements; effects of machining conditions, cold work and grinding on surface finish. Graphs and diagrams. (G17)

116-G. Precision Tube Bending. Gilbert C. Close. *Modern Machine Shop,* v. 25, Mar. 1953, p. 153-159.

Equipment and techniques employed in tangent bending of aircraft tubing. Photographs. (G6)

117-G. Thread and Form Rolling. Part 1. Types of Machines, Recommended Applications. C. T. Appleton. *Screw Machine Engineering,* v. 14, Mar. 1953, p. 31-35.

Reciprocating, rotary planetary, and cylindrical-die machines. Economy, thread rolling on screw machines, rates of production, and penetration rates. Tables and diagrams. (G12)

118-G. Speeds and Feeds for Drilling Steel. *Screw Machine Engineering,* v. 14, Mar. 1953, p. 53-54.

Data sheet based on use of high speed steel tools and an average 8-hr. tool life for parts made from cold drawn steel. (G17, CN, TS)

119-G. On Proper Tool Grinding for Machining Stainless Steels at Lower Costs With Higher Production. *Screw Machine Engineering,* v. 24, Mar. 1953 p. 55-56.

Data sheet showing that correctly ground tools lower unit cost. Describes grinding wheels for sharpening tools. (G18, SS)

120-G. (Book.) The Craft of the Metal Worker. R. S. Duddle. 160 pages. Anglobooks, 475 5th Ave., New York 17, N. Y. $4.00.

Contains a simple explanation, with adequate drawings, of many metalworking procedures. Some historical background. Does not cover machinery or machine operations.
(G general)

121-G. Guideposts to Titanium Cutting. V. J. Gauthier. *Steel,* v. 132, Mar. 23, 1953, p. 76-79.

Cutting fluids, feed rate, cutting speeds, tool angles, and chromium-plated high speed steel tools. Photographs. (G17, Ti)

122-G. Electric Arc Cutting of Aluminium. W. G. Warren. *Welding and*

Metal Fabrication, v. 21, Mar. 1953, p. 88-91.

Process which employs an electric arc as heat source and discharge from a ferrous wire electrode as cutting agent. Photographs, micrographs, and tables. (G22, Al)

123-G. Groove Cutting for the Shop. R. G. Householder. *Welding Journal,* v. 32, Mar. 1953, p. 232-234.

What a groove-cutting nozzle will do and how to use it. Photographs. (G22)

124-G. Effect of Shot Peening Upon the Transformation of Austenite. E. N. Bolkhovitinova. Henry Brutcher Translation 2958, 5 pages. (From *Vestnik Mashinostroenia,* v. 32, no. 5, 1952, p. 67-69.)

Effect on austenite transformation in carburized Cr-Mn-Ti steel. Akulov anisometer, which was used for determination of quantity of retained austenite, is described. Practical applications of experimental results. (G23, N8, AY)

125-G. Abrasive Belts Speed Production Contour Polishing and Grinding. Dirck Olton. *American Machinist,* v. 97, Mar. 2, 1953, p. 101-103; Mar. 16, 1953, p. 136-139; Mar. 30, 1953, p. 106-110.

Production applications of offhand abrasive-belt contour grinding. Part 2: Developments in various offhand setups. Part 3: Semi-automatic and completely automatic polishing and grinding setups. Photographs. (G18, L10)

126-G. How to Understand Plain Carbon Steel. Samuel Storchheim. *American Machinist,* v. 97, Mar. 1953, p. 111-118.

Discusses metallurgical fundamentals so that the nonmetallurgist can select and work carbon steel with greater advantage. Graphs and micrographs. (G general, CN)

127-G. Punched Tape Guides Milling Machine Cutters. J. O. McDonough. *Electronics,* v. 26, Apr. 1953, p. 135-137.

Automatic vertical milling machine which cuts out each piece in response to instructions punched in paper tape. Diagrams. (G17)

128-G. Making Components for Agricultural Machinery. Interesting Methods Employed at the Kilmarnock Factory of Massey-Harris, Ltd. *Machinery* (London), v. 82, Mar. 13, 1953, p. 467-474.

Methods including machining half-pulleys for the variable-speed main transmission, shaft turning, and turning cast-iron V-pulleys. Diagrams and photographs. (G17, CI)

129-G. Cast Valve Tappets Redesigned for Formed Steel. Kenneth Rose. *Materials & Methods,* v. 37, Mar. 1953, p. 108.

Cold heading and carbonitriding of tappets made of 5120 steel. (G10, J28, AY)

130-G. Turning and Milling Titanium. Norman Zlatin. *Modern Metals,* v. 9, Mar. 1953, p. 88.

Machining properties of Ti alloys. (G17, Ti)

131-G. Titanium Carbide Alloys in Tooling. W. L. Kennicott. *Tool Engineer,* v. 30, Apr. 1953, p. 61-64.

Abstract of paper 21T15, "Tool Engineering Applications of Titanium Carbide Alloys", American Society of Tool Engineers. Mechanical and physical properties; metal cutting and forming; dies; tong points and guides; jigs and fixtures; and gages. Photographs and diagrams. (G17, T5, Ti)

132-G. Metal-Cutting With Wax Lubricants. J. B. Carse and A. E. Budner. *Tool Engineer,* v. 30, Apr. 1953, p. 65-72.

Abstract of paper 21T7, "Wax Lubricants in Metalworking", American Society of Tool Engineers. Defines waxes and presents tabulated information on cutting of Al, steel, and stainless steel. (G21, Al, ST, SS)

133-G. Economics of Spinning and Drawing. John W. Lengbridge. *Tool Engineer,* v. 30, Apr. 1953, p. 89-94.

Abstract of paper 21T8, "An Evaluation of Drawing vs. Spinning", American Society of Tool Engineers. Factors to be considered before using either process. (G4, G13)

134-G. Adjustable Speed D-C Drives for Deep-Draw Presses. C. E. Robinson and A. P. Di Vincenzo. *Applications and Industry,* Mar. 1953, p. 9-16.

Basic drive considerations and description of a typical drive. Diagrams, graphs, and photographs. (G4)

135-G. Which Gray Irons for Large Volume Production? E. A. Loria. *Iron Age,* v. 171, Apr. 9, 1953, p. 131-133.

Results of machinability studies. Graphs and micrographs. (G17, CI)

136-G. Use Right Draw Speeds for Better Electrical Properties. Samuel Storchheim. *Iron Age,* v. 171, Apr. 9, 1953, p. 135-138.

Investigation in which commercial 302 and 304 stainless steels were drawn, using wide variation of speeds. Tables and graphs. (G4, P15, SS)

137-G. Mass-Producing Low-Cost Blanking Dies. R. C. Beaver. *Mod-*

ern Machine Shop, v. 25, Apr. 1953, p. 126-131.

Method of constructing the pierce blank template. Photographs. (G2)

138-G. "Million Dollar" Forming Tool. Gilbert C. Close. *Modern Machine Shop,* v. 25, Apr. 1953, p. 154-156, 158, 160, 162, 164.

Use of cam-action dies for producing flanged and beaded stainless steel rings. Diagrams and photographs. (G1, SS)

139-G. Cutting Fluids. Their Role in Machining. *Steel,* v. 132, Apr. 13, 1953, p. 106-109.

Based on paper by S. J. Aeaubien and A. G. Cattaneo. How the four basic properties of a cutting fluid affect tool failure due to heat, wear, and welding. Effect on surface finish. Graphs and photographs. (G21)

140-G. A Check List for the Design of Progressive Dies. Federico Strasser. *Steel Processing,* v. 39, Feb. 1953, p. 66-70, 87.

List for checking blank and stock; cutting die plate; cutting punches; auxiliary members; die set; forming members; and operations. Diagrams. (G1)

141-G. (Swedish.) **Hardness and Punching Properties.** H. Hanemann. *Jernkontorets Annaler,* v. 137, no. 1, 1953, p. 27-33.

Experiments on relationship of metal hardness to the permanent impression made by a punch under a given load. The term "punch flow-limit" is defined as that least amount of specific surface pressure to leave a permanent impression on a metal. Graphs and tables. (G2, Q29)

142-G. (Book.) **Basic Sheet-Metal Practice.** J. W. Giachino. 240 pages. International Text Book Co., Laurel Publishers, 325 Ash St., Scranton, Penn. $5.

Elementary operations of measuring layout patterns, edges, seams, and notches. Uses of various tools. (G general)

143-G. (Book.) **Manual on Cutting of Metals With Single-Point Tools. Ed. 2.** 546 pages. 1952. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

Types, uses, and preparation of single-point tools; mechanical characteristics and structures of work material; definitions, functions, and classification of cutting fluids; cutting forces, gross and net power at the cutter; net unit power for machining metals using a single size cut; economics of metal cutting; and tabular data on cutting speeds and horsepower for various feeds and depths of cut when turning steel and cast iron. (G17)

144-G. (Book—Russian.) **The Forming of Nonferrous Metals and Alloys by Pressure.** V. G. Serdiukov and Ya. Ya. Tsiersch. 508 pages. 1947. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Metalworking machinery and processes for forming sheet, plate, strip, tubing, and profiles. (G general, EG-a)

145-G. How to Machine the Rarer Metals. *American Machinist,* v. 97, Apr. 13, 1953, p. 183, 185.

Tooling recommendations for W, Mo, Ta, Ti, and Zr. (G17, W, Mo, Ta, Ti, Zr)

146-G. How to Solve Fabricating Problems of High-Temperature Alloys. Hiram Brown. *Iron Age,* v. 171, Apr. 16, 1953, p. 121-125.

Correlation of laboratory tests and production results. Shows that proper mill processing and heat treatment can prevent forming trouble. Micrographs. (G general, SG-h)

147-G. Hydraulic Lathe Cuts Roll-Machining Time. B. A. Wilson. *Iron Age,* v. 171, Apr. 16, 1953, p. 128-129.

Shows that hydraulic pressure keeps cutting tool at constant pressure against the roll. Lateral movement of the tool permits one continuous spiral cut along an even-faced roll. (G17)

148-G. Large Spun Metal Shapes. W. A. Wenman. *Materials & Methods,* v. 37, Apr. 1953, p. 93-95.

Techniques, advantages, applications, and use of hot spinning. Photographs. (G13)

149-G. Machinability of Metal Powder Parts. John L. Everhart. *Materials & Methods,* v. 37, Apr. 1953, p. 98-100.

Applications where at least some machining is required to reach the final shape. Photographs. (G17, H general)

150-G. Thread and Form Rolling. Part II. Machine Type Selection, Material Characteristics. C. T. Appleton. *Screw Machine Engineering,* v. 14, Apr. 1953, p. 60-66.

Reciprocating thread rolling machines; thread roll and die selection; die face width; single and multiple settings; and rollability. Tables and diagrams. (G12)

151-G. On How to Select the Best Lubricant or Coolant for Machining Stainless Steels. *Screw Machine Engineering,* v. 14, Apr. 1953, p. 73-74.

Data sheet on how to determine the best mixture and why cutting oils should be kept cool. (G21, SS)

152-G. Speeds & Feeds for Box Milling Steel. *Screw Machine Engineering,* v. 14, Apr. 1953, p. 75-76.
Data sheet. (G17, ST)

153-G. (German.) **Some Remarks on the Evaluation of Machinability Tests.** Wilhelm Spath. *Metalloberfläche,* v. 6, Dec. 1952, p. A186-A189.
Experimental data. Graphs. (G17)

154-G. Integrally - Stiffened Skin Milling. J. Daugherty and J. M. Delfs. *Aero Digest,* v. 66, Apr. 1953, p. 90-102, 104, 106, 108.
Machine developed specifically for milling self-reinforced aircraft skins from sheets of solid or rough-forged Al alloy. Photographs. (G17, Al)

155-G. Zone-Heated Dies Deep-Draw Thin Magnesium. *American Machinist,* v. 97, Apr. 27, 1953, p. 129-131.
Shows that sheets 0.040 to 0.064 in. thick can be drawn in depths to 30 in. in zone-heated dies in a 600-ton hydraulic press. Stock is spray lubricated and generally preheated. Photographs. (G4, Mg)

156-G. Silicon-Carbide Wheels for Carbide Grinding. Anderson Ashburn. *American Machinist,* v. 97, Apr. 27, 1953, p. 142-144.
Use of SiC as a replacement for diamond wheels. Photographs. (G18, C-n)

157-G. Even a Key Can Cut Through the "Unmachinable" With New Ultrasonic Tool. *Inco Magazine,* v. 26, no. 1, 1953, p. 12-14.
Electronic device which vibrates at 1,620,000 times a minutes and can drive through glass, metals, and other materials of diamond-like hardness. Photographs. (G17)

158-G. Machining Practices Affect Mechanical Properties of Aluminum. *Iron Age,* v. 171, Apr. 23, 1953, p. 151.
Tests using 24S-T4 alloy. Tabulated results. (G17, Q general, Al)

159-G. Arc-Cutting Process for Aluminium Alloys. *Light Metals,* v. 16, Apr. 1953, p. 114-115.
Cutting process using an electric arc and consumable steel electrode. (G22, Al)

160-G. The Impact Extrusion of Aluminium. K. A. Galloway. *Light Metals,* v. 16, Apr. 1953, p. 125-128.
Technique, plant, tools, tool design, and accessory factors needed for production of successful impact extrusion. Diagrams. (G5, Al)

161-G. Tools for Machining Aluminum. *Metal-Working,* v. 9, May 1953, p. 18-20.
Tool shapes, materials, and finishes. General machining practices for Al alloys. Tables. (G17, Al, TS)

162-G. Republic Steel Corporation Turns to Production of Steel Kitchen Units. Walter Rudolph. *Modern Industrial Press,* v. 15, Apr. 1953, p. 13, 16, 18, 20.
Pictorial presentation.
(G general, T10, ST)

163-G. Lithium-Based Multi-Purpose Grease for Use in Stamping Plants. *Modern Industrial Press,* v. 15, Apr. 1953, p. 22, 24, 46.
Properties and advantages of the grease. (G3)

164-G. Fundamental Factors in Grinding Titanium. Gordon T. Rideout.. *Modern Metals,* v. 9, Apr. 1953, p. 42, 44.
Influence of speed, grinding fluids, rust inhibitors, fire hazard with oil, grit size, and how to finish grind. (G18, Ti)

165-G. Fundamental Factors in Machining Titanium. M. E. Merchant. *Modern Metals,* v. 9, Apr. 1953, p. 60, 62.
Reasons why Ti is difficult to machine. Photographs. (G17, Ti)

166-G. Tin-Box Making. G. Taylor. *Sheet Metal Industries,* v. 30, Apr. 1953, p. 277-280.
Details of some special tools for increased production. (G3, CN, Sn)

167-G. The Continuous Sheathing of Electric Cables With Aluminium. Details of New Process Developed by the General Electric Co. Ltd. and Pirelli-General Cable Works Ltd. *Sheet Metal Industries,* v. 30, Apr. 1953, p. 291-295.
Manufacture, mechanical performance of welded sheath, weld strength and soundness, and field installations. Photographs.
(G general, K general, T1, Al)

168-G. New Wrinkle in Stretch Wrap Forming. M. J. Connington and W. F. Thurber. *Steel,* v. 132, Apr. 27, 1953, p. 102-103.
Development of curved jaws for gripping metal sheet. Photographs. (G9)

169-G. Extrusion Goes Commercial. *Steel,* v. 132, Apr. 27, 1953, p. 106, 108.
Production of a variety of commercial shapes. Photographs. (G5, CN)

170-G. New Ideas Yield Dividends. Thomas A. Dickinson. *Steel Processing,* v. 39, Apr. 1953, p. 163-165, 191.
Methods for producing sheet metal parts and assemblies. Photographs. (G general)

171-G. Tool Materials for Punches and Dies. Lester F. Spencer. *Tool Engineer,* v. 30, May 1953, p. 35-40.

Factors to be considered when selecting steels for tools. (G2, TS)

172-G. Copper-Nickel-Tin Coining and Stamping Alloys. J. W. Cuthbertson. *Metal Industry,* v. 82, Apr. 17, 1953, p. 301-303.

Investigation to use Sn as a partial substitute for Ni. Tables and diagrams. (G3, Cu, Ni, Sn)

173-G. Carbon Dioxide Permits Improved Machining Time. E. W. Bartle. *Machinery* (American), v. 59, Apr. 1953, p. 157-158.

Cutting speeds and feeds employed in contour-machining heat resisting steel parts for aircraft jet engines were increased by using liquid CO_2 to absorb heat generated in such operations. Photographs. (G21, SG-h)

174-G. 52 Inches of Steel. Cutting Time: 35 Minutes. *Welding Engineer,* v. 38, May 1953, p. 56-57.

Technique which makes flame cutting economical. Apparatus, setup, and operating expenses. Photographs. (G22, ST)

175-G. Stretch-Forming. Part III. Tooling Methods. Die Materials. The Construction and Use of Matched Tools. Support-Snakes. Heat-Treatment. (Concluded). *Aircraft Production,* v. 15, May 1953, p. 169-171.

Construction methods for various types of forming dies. Die materials and the use of auxiliary equipment such as formed pressure-bars and snakes. Typical examples are illustrated. Diagrams. (G9, Al)

176-G. Relative Abrasiveness of the Cast Surfaces of Various Gray-Iron Castings on Single-Point Tools of High-Speed Steel. Joseph Datsko and O. W. Boston. *ASME, Transactions,* v. 75, Jan. 1933, p. 103-107; disc., p. 107-108.

Means for eliminating abrasive surfaces consisting of combined annealing and pickling treatments. Micrographs and graphs. (G17, J23, L12, CI)

177-G. Electrolytic Grinding or Machining of Metals. O. W. Storey. *Electrochemical Society, Journal,* v. 100, May 1953, p. 125C-126C.

Electrolytic grinding method which utilizes a fast-moving cathode having spaced-apart insulating particles imbedded in its surface and protruding evenly above it for spacing the cathode from the work. (G18)

178-G. How to Increase the Life of Cutting Dies. Federico Strasser. *Iron Age,* v. 171, May 14, 1953, p. 144-146.

Factors which influence die life. (G1)

179-G. Deep Drawing Steel Sheet Surface Quality. R. J. Walter. *Journal of Metals,* v. 5, May 1953, p. 630.

Describes defects which are likely to occur during production and emphasizes importance of inspection. (G4, S13, CN)

180-G. Cost-Cutting Dies. Peter S. Tobias and Carl Erickson. *Machinery* (American), v. 59, May 1953, p. 155-162.

Describes a few of the most outstanding dies employed for producing control instrument parts. Diagrams, photographs. (G1)

181-G. Bending Hollow Rectangular Tubing at Raytheon. Harry F. Clarke. *Machinery* (American), v. 59, May 1953, p. 170-174.

Methods employed in bending and twisting hollow rectangular tubing with smooth, regular, and continuous inside surfaces. Photographs. (G6)

182-G. Application of Stellite to Machining. *Machinery Lloyd* (Overseas Ed.), v. 25, Apr. 25, 1953, p. 91-92.

Types of cutting metals, shaping the alloy, and cutting speeds. (G17, SG-j)

183-G. Mounting Keeps Vibration in Its Place. William C. Gallmeyer. *Steel,* v. 132, May 18, 1953, p. 90-91.

Vibration-reducing mountings on a grinder motor keep vibrations from reaching the grinding wheel. Diagrams. (G18)

184-G. (French.) **The Oxygen Lance as a Fabrication Device.** C. G. Keel. *Revue Soudure,* v. 8, no. 4, 1952, p. 158-174.

Application to machine construction, metallic framework fabrication, engines, and apparatus. Photographs, graphs, diagrams. 10 ref. (G22)

185-G. (German.) **Analysis of Machining Experiments of Special Alloys.** Wilhelm Späth Lustadt. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A6-A8.

Analysis is made from standpoint of theoretical observations, test results, and abrasion criteria for carbide tools. Graphs. 6 ref. (G17, C-n)

186-G. (German.) **Machining Problems.** W. Späth. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2 1953, p. 39-44.

Analysis of machining tests, influence of gaseous cooling agents, workability, and microstructure of cast iron. (G17, CI)

187-G. Rubber-Forming Kink Cuts Wrinkles at Convair. Robert B. Stanton. *American Machinist,* v. 97, May 25, 1953, p. 132.

Use of steel master parts with rubber pressure pad for producing wrinkle-free Al parts. (G8, Al, ST)

188-G. Requirements of Machine-Shop Inspection. C. Walker and F. H. Greenwood. *Institute of British Foundrymen, Proceedings,* v. 45, 1952, p. B125-B131; disc., p. B131-B133.

Machinists' viewpoint for quality of castings including design, jigging, accuracy, machinability, and inspection. Inspection methods used by Vauxhall Motors' works. Photographs. (G17, S general, CI)

189-G. Large Gears Produced Faster, Cheaper, and More Accurately. F. P. Hennessy. *Iron Age,* v. 171, May 21, 1953, p. 140-143.

New technique which eliminates dual tooling. Photographs. (G17)

190-G. Fabricating of Metal Partitions at Steel Partitions, Inc. Walter Rudolph. *Modern Industrial Press,* v. 15, May 1953, p. 13, 16, 18, 22.

Illustrates press equipment. (G1, ST)

191-G. Producing Side Rails for Motor Vehicle Chassis Frames. *Modern Industrial Press,* v. 15, May 1953, p. 56-57.

New press for forming side rails. (G1, CN)

192-G. Fabricating & Finishing Aluminum Cartridge Tanks. *Modern Metals,* v. 9, May 1953, p. 60-62, 64.

Formation of the Aluminum Goods Manufacturing Co. Discusses anodizing and airless spray painting of Al cartridge tanks. Photographs. (G general, L19, L23, Al)

193-G. Tapping Titanium. V. Jamilkowski. *Modern Metals,* v. 9, May 1953, p. 66-67.

Machining characteristics, thermal qualities, retapping, correct tap design, and suitable lubricant. (G17, G21, Ti)

194-G. (French and German.) **Deep Drawing of Aluminum and Aluminum Alloys.** George Sachs. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 38-48.

Pure Al and its heat treated alloys in relation to deep drawing of round containers and box-shaped parts in one operation, drawing of deeper parts with and without weakening of sheet, hot drawing of alloys, and drawing with rubber cushion. Photographs, graphs, diagrams. (G4, Al)

195-G. (French and German.) **Automatic Progressive Drawing in Working of Light Metals.** *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 55-56.

Automatic press that carries out several stampings as a continuous process. Intermediate heatings increased deformability. (G4, Al)

196-G. (German.) **New Researches Into the Deep-Drawing of Light Metals.** *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 49-51.

Test results on rounding off, friction forces, lubricants, and other factors. (G4, Al)

197-G. (German.) **Modern Facts on Formation of Ears During Deep-Drawing of Pure Aluminum and on Possibilities of Its Suppression.** H. A. J. Stelljes. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 155-161.

Classifies and describes ears in relation to crystalline orientation by means of X-ray diagrams. Appropriate types of annealing furnaces. Photographs, graphs. 5 ref. (G4, J23, Al)

198-G. (German.) **Effect of Cold-Forming on Aging and Superstructure.** A. Kussmann. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 182-186.

Extent to which property changes may be attributed to local temperature rises that accompany hardening. Testing of disturbance of atomic arrangement during plastic stressing. 22 ref. (G general, N7)

199-G. (Russian.) **High-Speed Oxygen Cutting.** A. N. Shashkov and S. G. Guzov. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 1-4.

Theoretical investigation. Comparison is made between ordinary and high-speed cutting with respect to expediency, time, and economy. Describes newly developed torch. Tables, photographs, graphs. (G21)

200-G. (Russian.) **Machine Cutting Stamped Heads.** L. I. Blagodatskii. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 25.

Automatic flame-cutting equipment for parts which do not require further machining. Used for boiler parts and heads. (G22)

201-G. (Book—German.) **(Upsetting and Pressing.) Stauchen und Pressen.** J. Billigmann. 574 pages. 1953. Carl Hanser Verlag, München, Germany. 28.50 Dm.

Mass production of small and medium-sized metallic objects without machining. Numerical data, tables. (G general)

202-G. Producing Pressed Metal Bathtubs. Sweden. Gösta E. Sandstrom. *Finish,* v. 10, June 1953, p. 49-53.

Layout and equipment. Photographs. (G1, L27, CN)

203-G. Grinding Plus Mechanization Equals 2 Times Cleaning Output. W. M. Fitzsimmons. *Iron Age,* v. 171, May 28, 1953, p. 132-134.

How casting cleaning department, modernized with grinding equipment and mechanized conveyors, has doubled output with half as many men. More thorough cleaning has sharply reduced rejects. (G18, CI)

204-G. Cast Meehanite Rolls Used for Heavy-Duty Bending. M. R. Nelson. *Iron Age,* v. 171, May 28, 1953, p. 135-137.

By designing and casting large plate bending rolls of Meehanite metal, a plant's capacity for rolling boiler plate was increased from 1 in. to 2½ in. (G6, T5, CI)

205-G. Machining. Theory and Practice. K. G. Lewis and W. Milne. *Machinery* (London), v. 82, May 15, 1953, p. 918-924.

Grinding sensitivity and burn; and machining steels, cast irons, and various nonferrous alloys. Micrographs. (G17, G18, ST, CI, EG-a)

206-G. Soviet Machine Tools. Special Purpose Equipment and Machines. J. Mannin. *Engineers' Digest,* v. 14, May 1953, p. 174-178, 186.

Measuring and machining. Describes a bevel spiral gear generator and a gear grinder. Diagrams. (G17, G18)

207-G. The Carbide Milling of Cast Steel Components. Herman Reichardt. *Machine and Tool Blue Book,* v. 49, June 1953, p. 155-159.

Basic methods of estimating power consumption and cutter requirements. Information can be used on all milling operations where carbides are used. (G17, CI)

208-G. High Speed Steel Drilling Speeds and Feeds for Various Materials. *Machine and Tool Blue Book,* v. 49, June 1953, p. 207.

Tabulated information on drilling speeds for Al, Cu, and various steels. (G17, Al, Cu, CN, CI, AY)

209-G. Suggested Surface Speeds for Various Work Materials. *Machine and Tool Blue Book,* v. 49, June 1953, p. 209.

Tabulated information on surface speeds for Al, Cu, plastics, and various steels.
(G17, Al, Cu, AY, SS, CI, TS)

210-G. Suggested Table Feeds (in Inches Per Tooth) for Various Work Materials When Machined With Multiple Point Tools. *Machine and Tool Blue Book,* v. 49, June 1953, p. 211.

Tabulated information on table feeds for Al, Cu, plastics, and various steels.
(G17, Al, Cu, CI, AY, SS, TS)

211-G. Hydraulic Forming Techniques Applied to the Manufacture of Musical Instruments. *Machinery* (London), v. 82, June 12, 1953, p. 1089-1099.

Modifications of hydraulic forming techniques, hydraulic forming of tubes, and hydraulic forming presses. Photographs. (G1, Cu)

212-G. Producing Gas Turbine Parts With Minimum Metal Wastage. Cyril J. Bath. *Machinery* (London), v. 82, June 12, 1953, p. 1101-1104.

Uses of radial draw forming. Illustrations. (G9)

213-G. Processing of Boron Steels in the Shop. G. D. Rahrer. *Metal Progress,* v. 63, May 1953, p. 85-89.

Machining; punching; cold forming, such as cold heading and hobbing; hot forming; and welding. Tables. (G general, K general, AY)

214-G. Electrolytically-Assisted Diamond Wheel Grinding of Carbides is "Promising". *Metal Progress,* v. 63, May 1953, p. 198, 200, 202.

Condensed by A. H. Allen from "Electrolytically-Assisted Diamond Wheel Grinding of Cemented Carbide", by N. W. Thibault and B. H. Anderson, Technical Bulletin 526, Norton Co., Worcester, Mass., Nov. 1952. Experimental testing on grinding of carbide tools. (G18, C-n)

215-G. Solving Stainless Steel Fabricating Problems. Lester F. Spencer. *Modern Machine Shop,* v. 25, May 1953, p. 126-134; v. 26, June 1953, p. 164-168, 170-171, 174, 176, 178, 180, 182, 184.

Problems in use of austenitic grades of stainless steels, including bending and drawing operations. Diagrams. (G4, G6, SS)

216-G. Die Maintenance. A. Peterson. *Modern Machine Shop,* v. 26, June 1953, p. 188-190, 192.

Die alignment and the use of standard die sets. (G general)

217-G. (German.) High Capacity Tools for Working of Light Metal Sheet. G. Oehler. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 428-435.

Construction and operation of tools for deep drawing. Stretching and rubber pad drawnig processes. (G4, G8, G9, Al)

218-G. (German.) Machining Rules for Various Materials and Tools. W. Späth. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 241-247.

Problems and answers regarding dependence of tool application on cutting speed. Graphs, tables. 6 ref. (G17)

219-G. (German.) **Computing of Temperature Distribution in Case of Oxy-Acetylene Cutting.** Peter Grassmann. *Zeitschrift für angewandte Physik,* v. 4, no. 12, Dec. 1952, p. 455-458.

Temperature range was computed for a linear heat source moving in a straight line with a constant speed through a heat-conducting plate. (G21)

220-G. Stampings. Cheapening Production by Improving Design. Federico Strasser. *Iron & Steel,* v. 26, May 1953, p. 183-187; June 1953, p. 303-307.

Examples of practical and economical results obtained from the collaboration between article designer and tool engineer. Diagrams. (G3)

221-G. Cutting Characteristics of Titanium and Its Alloys. L. V. Colwell and W. C. Truckenmiller. *Mechanical Engineering,* v. 75, June 1953, p. 461-466, 480.

Investigation to evaluate unique and pertinent cutting characteristics of Ti and its alloys to designate necessary changes in commercial practice in regard to tools, size of cut, speed, etc. Tables, micrographs. 7 ref. (G17, Ti)

222-G. Speeds and Feeds for Cutting Off Steel. *Screw Machine Engineering,* v. 14, June 1953, p. 53-54.

Tabulated data sheet. (G17, ST)

223-G. The Cold Extrusion of Steel. H. Fischer. *Sheet Metal Industries,* v. 30, June 1953, p. 447-457; disc., p. 457-463.

Theoretical aspects of deformation in steel. Requirements for presses and construction of tools for various applications. Diagrams, photographs, graphs. (G5, ST)

224-G. The Cold Extrusion of Steel and the Use of Hydraulic Presses. E. V. Crane. *Sheet Metal Industries,* v. 30, June 1953, p. 464-475; disc., p. 484-489, 501.

Development of the process; equipment used. Photographs, diagrams, tables. (G5, ST)

225-G. The Relative Merits of Presses for the Cold Extrusion of Steel. T. F. Massey. *Sheet Metal Industries,* v. 30, June 1953, p. 479-483; disc., p. 484-489, 501.

Extrusion process, general press requirements, and press selection. (G5, ST)

226-G. Mechanical Press Equipment for the Cold Extrusion of Steel. E. K. Johansen. *Sheet Metal Industries,* v. 30, June 1953, p. 476-478, 483; disc., p. 484-489, 501.

Requirements demanded in a press. Describes a 1500-ton mechanical press to be used for experimental purposes. (G5, ST)

227-G. A Review of Phosphate Coatings for Assisting Cold Extrusion. H. A. Holden. *Sheet Metal Industries,* v. 30, June 1953, p. 502-512.

Principles of phosphating, phosphate coating + lubricant, behavior of Zn-phosphate coatings before and during cold working, and phosphating practice for cold extrusion. Photographs, micrographs, tables. 36 ref. (G21, L14, Zn, ST)

228-G. Metallurgical Requirements of Steels for Cold Extrusion. D. V. Wilson. *Sheet Metal Industries,* v. 30, June 1953, p. 513-520, 522, 524.

Influence of composition on extrusion pressure, influence of microstructure, reductions attained in cold extrusion, surface quality requirements, influence of rate of straining, strain-aging, inhomogeneous deformation, stress relieving, and directionality of properties. Graphs, diagrams, micrographs. (G5, M27, Q general, ST)

229-G. Surface Grinding. Consider Coated Abrasives. Warren K. Seward. *Steel,* v. 132, sec. 1, June 22, 1953, p. 126-128, 131.

Advantages of using belts coated with a relatively thin layer of abrasive mineral and bonding agent. Photographs. (G18)

230-G. Die Design for Metal Drawing. Charles R. Cory. *Steel Processing,* v. 39, June 1953, p. 269-272.

Form dies used for producing parts where there is no tendency to form wrinkles, for bending processes, or for forming curved shapes where the metal is in a state of stretch. Diagrams. (G4)

231-G. New Forming Process Reduces Vibration and Tooling Costs. Thomas A. Dickinson. *Steel Processing,* v. 39, June 1953, p. 283-285, 302.

Use of rubber pressure pads and hydraulic shock absorbers so forming pressures or impacts will be evenly distributed over sheet metal blanks. Photographs. (G8)

232-G. Shop Characteristics of Commercial Titanium and Its Alloys. T. W. Lippert. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 69-75; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Forming, grinding, machining, and welding. (G general, K general, Ti)

233-G. (French.) **Machinability of Stainless Steel.** J. Daurat. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 191, 193-195.

Drilling of stainless steel. Table, diagrams. (To be continued.) (G17, SS)

234-G. (German.) **Why Strip-Polishing Lubricant?** W. Burkart. *Metall,* v. 7, nos. 9-10, May 1953, p. 328-330.

Attempts to justify use of lubricant in contact-grinding process. Properties of a good lubricant enumerated. Micrographs. 5 ref. (G21, G18)

235-G. (German.) **Liquid Honing in Metallurgical Practice.** Hans H. Finkelnburg. *Metall,* v. 7, nos. 9-10, May 1953, p. 330-334.

Relationship between grain size, coarseness, splitting honing agent grains, angle of injection, distance of jet from object, and treatment of extruded and cast forms. Photographs, graphs, diagrams. (G19)

236-G. (German.) **Hard-Metal Tools for Machining of Light Metals.** F. Heinrichs. *Metall,* v. 7, nos. 9-10, May 1953, p. 340-342.

Choice of materials, demands on the machine, turning, type of turning tool, surface structure of the object, lubrication, upkeep of tool and velocity of cutting. Tables, diagrams. 7 ref. (G17, T5, Al)

237-G. (German.) **Present-Day Position of Machining Research.** E. Bickel. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 4, Apr. 1953, p. 105-113.

Materials testing; research methods and measurements; criterion of dulling; and machinability as a property of a material. Photographs, graphs, diagrams. (G17)

238-G. New Snagging Machine Triples Guide Output. William M. Fitzsimmons. *American Foundryman,* v. 23, June 1953, p. 56-57.

Advantages of the machine for foundry grinding. Use with gray iron valve guide castings is described. (G18, CI)

239-G. How To Make Impact Extrusions of High-Strength Aluminum. J. D. Shoemaker. *American Machinist,* v. 97, July 6, 1953, p. 129-140.

Tool design and construction; slug development; lubrication; and production. Photographs, diagrams, graphs. (G5, Al)

240-G. Actual Minutes for Tapping. V. G. Hotchkiss. *American Machinist,* v. 97, June 22, 1953, p. 157, 159.

Tabulated data for recommended speeds and actual minutes for tapping grey iron, malleable iron, and mild steel products. (G17, CI, CN)

241-G. Drawn Parts of Stainless Steel. *Electrical Manufacturing,* v. 52, July 1953, p. 116-121.

Case histories, specific design data, and suggestions for optimum cost, appearance, and performance. Diagrams, photographs. (G4, SS)

242-G. Industrial Application of Metal Spinning. Arnold Hildebrandt. *Finish,* v. 10, July 1953, p. 20-24.

Nontechnical description of manual and automatic spinning operations. Stainless steel parts are used as examples. Photographs. (G13, SS)

243-G. Precision Rolling Forms Jet Seals at High Speed. W. G. Patton. *Iron Age,* v. 171, June 25, 1953, p. 128-130.

Equipment which forms jet seals from high-alloy Ni strip and carbon steel. Photographs. (G11, Ni, CN)

244-G. Butt-Brazed Carbide Tips Improve Tool Life. Walter Jellig. *Iron Age,* v. 171, June 25, 1953, p. 140-142.

Tool life was increased 200% when butt-brazed carbide tips were used to finish SAE 4340 forgings. Photographs. (G17, K8, AY)

245-G. Cool the Coolant for Precise Machining. Wayne Stone. *Iron Age,* v. 172, July 2, 1953, p. 129-132.

Methods of refrigerating the coolant when machining parts for R-1820 Wright radial engines. Photographs, diagrams. (G17)

246-G. Die Pressure in Plane Strain Drawing. Comparison of Experiment With Theory. J. G. Wistreich. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 164-171.

Various measurements interpreted. Graphs, tables. (G4)

247-G. Dull Machining Tools Change Aluminum Physical Properties. Robert Wolcott. Jr. *Light Metal Age,* v. 11, June 1953, p. 19, 37.

Results of tests indicate that weaknesses in machined heat treated Al alloy may be result of high temperatures during machining operations. (G17, Al)

248-G. A New Performance Test for Cutting Fluids. J. M. Stokely. *Lubrication Engineering,* v. 9, June 1953, p. 137-139.

Laboratory performance test for cutting fluids which correlates well with field performance. It permits rapid evaluation of the effect of additives at various concentrations, as well as direct comparisons of finished cutting fluids. Graphs. (G21)

249-G. Hydraulic Forming Techniques Applied to the Manufacture of Musical Instruments. *Machinery* (London), v. 82, June 26, 1953, p. 1194-1196.

Making white Cu dies and stretch forming reinforcing bands. Photographs. (G9)

250-G. Unconventional Methods of Machining Metal. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 97-99, 101.

Electrolytic turning (British) and

the spark machining process (Russian). Diagrams, photographs. (G17, Cu, Fe)

251-G. Recent Developments in the Machining of Hard Materials. A. G. Gardner. *Mechanical World and Engineering Record,* v. 133, May 1953, p. 202-204.

Electrosparking, electro - arcing, electrolytic, and ultrasonic processes. (G17, EG-d)

252-G. Thin Metals That Remain Flat After Machining. John C. Wagner. *Metal Progress,* v. 63, June 1953, p. 92-94.

Shows that Al alloy 61S-T6 is satisfactory for production of precision instrument parts. Photographs. (G17, T8, Al)

253-G. Punch Presses and Welders Work Together to Make Wire Products. Howard E. Jackson. *Modern Industrial "Press",* v. 15, June 1953, p. 34, 38, 42, 44, 46, 48.

Pictorial presentation. (G2, K general)

254-G. Abrasive Belts Get Into Every Nook and Cranny. Jack Durnan. *Precision Metal Molding,* v. 11, July 1953, p. 50-51, 53-55.

Use of abrasive belts to grind and polish Al and Zn die cast parts. Photographs. (G18, Al, Zn)

255-G. Pros and Cons. Carbon Dioxide as a Coolant. John C. Welch, Jr. *Western Machinery and Steel World,* v. 44, June 1953, p. 84-85.

Advantages, quality and quantity used for particular operation, and cost. (G21)

256-G. (German.) **New Processes of Surface Finishing by Honing.** A. Linek. *Metalloberfläche,* v. 7, no. 5, May 1953, p. A73-A75.

New methods and equipment for finishing machine parts. Photographs. (G19, CN)

257-G. Colossal Press Spearheads Lockheed's Skin Program. Reed B. Scott and R. L. Vaughn. *Machinery* (American), v. 59, July 1953, p. 166-171.

An 8000-ton press for forming Al aircraft parts. Photographs (G1, Al)

258-G. Jet-Engine Aft Frames by Ryan Production Methods. Lawrence M. Limbach. *Machinery* (American), v. 59, July 1953, p. 172-181.

Machining operations on complicated stainless steel part for jet engine. (G17, SS)

259-G. Machining. Theory and Practice. K. G. Lewis and W. Milne. *Machinery (London),* v. 83, July 10, 1953, p. 69-75, 94.

Effects of alloying elements; machinability of medium carbon alloy steels, stainless steels and cast irons; effect of microstructure on machinability; effect of feed and speed on tool life; machining of Cu, Al, and Mg alloys; and machining conditions. Graphs, tables. (G17, M27, Cu, Mg, Al, CI, SS, CN)

260-G. Working Titanium at North American. Gordon A. Fairbairn. *Machinery* (American), v. 59, July 1953, p. 182-187.

How sheet, bar stock, and forgings are used. Considers machining, cold forming, and heat treating. Photographs. (G17, F22, J general, Ti)

261-G. Stretch Forming Aluminum. E. V. Sharpnack, Sr. *Sheet Metal Worker,* v. 44, July 1953, p. 109.

Action eliminating basic cause of distortion after forming. Diagrams. (G9, Al)

262-G. Know Your Terminology for Drawn Shells. I. Stanley R. Cope. *American Machinist,* v. 97, Aug. 3, 1953, p. 110-113.

Types of shells; differentiates between drawing and redrawing operations. Considers stainless steel, brass, Al, Cu, Zn, Ni, and Mg. Diagrams. (To be continued.) (G4, Mg, Cu, Al, Zn, Ni, SS)

263-G. How Sharp Are Carbide Tools Finished With Silicon Carbides? John C. Redmond. *American Machinist,* v. 97, Aug. 3, 1953, p. 120.

Compares cutting edge of diamond and Si carbide grinding wheels. Micrographs. (G18, C)

264-G. Time for Drilling Mild Steel. V. G. Hotchkiss. *American Machinist,* v. 97, Aug. 3, 1953, p. 149.

Data sheet. (G17, CN)

265-G. A Case for Coated Abrasives. *Canadian Metals,* v. 16, July 1953, p. 48, 50-51.

Types of abrasives, backings, adhesives and wheels versus belt. Diagrams. (G18)

266-G. Fabricating the Steel Television "Tube". Arnold Hildebrandt. *Finish,* v. 10, Aug. 1953, p. 29-31, 74.

Combination of "automatic" metal spinning and press operations. Photographs. (G13, G1)

267-G. New Optical Layout System Minimizes Fabrication Problems. *Industry & Welding,* v. 26, Aug. 1953, p. 44-45, 47-48, 51.

New method permitting optical projection-of scale drawings directly and in full size on the material to be fabricated. (G general)

268-G. Precision Cold Drawing of Small Sections. *Machinery* (London), v. 83, July 17, 1953, p. 99-107.

Examples showing extent to which process is being applied. Diagrams, photographs. (G4)

269-G. Reducing Machining Times by the Use of Carbon Dioxide Coolant. E. W. Bartle. *Machinery* (London), v. 83, July 24, 1953, p. 172-174.

Procedure and use of coolant. Photographs. (G17, G21)

270-G. Factors That Cause Defective Rolled Threads. *Metal Working,* v. 9, Aug. 1953, p. 20-21.

Tabulated information. (G12)

271-G. Peelable Plastic Coatings in the Stamping Plant. *Modern Industrial "Press",* v. 15, July 1953, p. 6, 8, 10.

Uses of plastic films to protect metals during fabrication. Photographs. (G3)

272-G. Specialists in Stainless Steel Fabrication. Howard E. Jackson. *Modern Industrial "Press",* v. 15, July 1953, p. 13-14, 16, 18, 22.

Production of sinks, drainboards, counters, work tables, cabinets, and lockers. Photographs. (G general, SS)

273-G. Titanium—a New Metal for Stampers to Watch. *Modern Industrial "Press",* v. 15, July 1953, p. 46, 48, 50, 56.

General data on supply, production, properties, and uses. Photographs. (G3, Ti)

274-G. Producing High Speed Turbine Wheels. Gilbert C. Close. *Modern Machine Shop,* v. 26, Aug. 1953, p. 114-119.

Extruding and profiling methods for manufacturing tiny turbine wheels for aircraft. Photographs. (G5, G17)

275-G. Two Giants for Tool Up. *Steel,* v. 133, Aug. 3, 1953, p. 102.

2000-ton hydraulic press and 36 ft. plate planer. Photographs. (G1, G17)

276-G. Radial Forming by Ryan. *Steel Processing,* v. 39, July 1953, p. 324-326.

An expanding mandrel which quickly and efficiently shapes stainless steel and Al contoured closed sections. Photographs. (G9, Al, SS)

277-G. Station Stops for Progressive Dies Reduce Waste. Federico Strasser. *Tool Engineer,* v. 31, Aug. 1953, p. 65-67.

Stops with and without springs. Diagrams. (G1)

278-G. Riverbank Ordnance Site Now Has Giant Presses. Wilbur D. Russell. *Western Machinery and Steel World,* v. 44, July 1953, p. 74-77.

Reconversion program for large-scale production of 105 and 155-mm. steel shell cases. Photographs. (G1, ST)

279-G. Bolts for the Aircraft Industry. Russell H. Bennett. *Western Machinery and Steel World,* v. 44, July 1953, p. 92-94.

Production of bolts. Illustrated. (G10, G17, K13)

280-G. On the Temperature Developed at the Shear Plane in the Metal Cutting Process. Robert S. Hahn. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers", American Society of Mechanical Engineers, p. 661-666.

By the use of the theory of heat conduction from sources and sinks, an analysis is made of the temperature distribution on the shear plane. Analytical results are presented in graphical form in terms of dimensional factors. Experimental determinations of chip temperatures from actual cutting tests are presented. Graphs. 8 ref. (G17, Al, Cu, ST)

281-G. (German.) Extrusion and Punching Method. A. Geleji. *Acta Technical Academiae Scientiarum Hungariae,* v. 4, nos. 1-4, 1952, p. 273-292.

Theoretical analysis of stresses and pressures. Micrographs, graphs, drawings. 13 ref. (G2, G5)

282-G. (Russian.) Designing Templates for Gas Cutting Machines. V. A. Toropov. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 19-21.

Forms of templates. Three examples. Diagrams. (G22)

283-G. (Russian.) Material and Heat Balance of Trimming and Cutting Low-Carbon Steel With Oxygen. A. K. Nimburt. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 1-5.

Slags formed as a result of oxygen cutting. Correlation between slag composition and the heat requirements. Tables, graphs. 7 ref. (G22, CN)

284-G. (Russian.) Machinability of High Speed Steel. E. I. Feldshtein. *Stanki i Instrument,* v. 24, no. 1, Jan. 1953, p. 29-30.

Experiment and results. Highest cutting speed was obtained for a structure of granular pearlite and fine, uniformly distributed carbides. (G17, TS)

285-G. On the Mechanics of Cutting Metal Strips With Knife-Edged Tools. R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 265-270.

Details of deformation, load variation, expenditure of work and influences of friction and hardening. Tables, diagrams. 5 ref. (G17, ST)

286-G. Which Metal Form. Spun or Drawn? John W. Lengbridge. *Materials & Methods,* v. 38, Aug. 1953, p. 87-91.

Adapted from a paper presented at the 1953 meeting of the American Society of Tool Engineers. Advantages and limitations of both processes. Diagrams, tables. (G4, G13)

287-G. (French.) Details Relative to the Machining of Metals. Pierre Sorin. *Comptes rendus,* v. 236, no. 25, June 22, 1953, p. 2406-2407.

"Self-machining" phenomena. (G17, Al)

288-G. (French.) The Machinability of Stainless Steel. J. Daurat. *Métallurgie et la Construction Mécanique,* v. 85, no. 3, Mar. 1953, p. 191, 193-195; no. 4, Apr. 1953, p. 275, 277, 279, 281; no. 5, May 1953, p. 387, 389; no. 6, June 1953, p. 487-489.

Drilling and tapping operations and methods for grinding and machining of various Cr, Ni, and other steels. Tables, diagrams. (To be continued) (G17, G18, SS)

289-G. (French.) Recent Findings on Earing During Aluminum Drawing. The Possibility of Suppressing It. H. A. J. Stelljes. *Revue de Métallurgie,* v. 50, no. 3, Mar. 1953, p. 189-198; disc., p. 198.

Investigations undertaken in France, Germany and Switzerland. Diagrams, photographs, tables. (G4, Al)

290-G. (French.) Present Tendencies in Metal Cutting. F. Jamar. *Revue universelle des mines,* v. 9, ser. 9, no. 4, Apr. 1953, p. 196-204.

Development, limits, and tendencies of machine tools in peripheral milling with the aid of high-speed steel tools. Graphs, diagrams. 20 ref. (G17, TS)

291-G. (German.) Grinding and Polishing Aluminum. W. Burkart. *Aluminium,* v. 29, no. 5, May 1953, p. 198-200.

Working conditions and numerous faults. Photographs. 10 ref. (G19, L10, Al)

292-G. (Hungarian.) Deep-Drawing Tests of Aluminum Plate With High Iron Content and Alloyed With Manganese. Gyorgy Haimos. *Aluminium,* v. 5, no. 4, April, 1953, p. 73-77.

Reports on series of tests. Results are compared with those of better Al alloys. Possibilities of practical application for above type Al alloys. Tables, graphs, photograph. (G4, Al)

293-G. Cutting Oils and Their Uses. *Australasian Engineer,* May 7, 1953, p. 95-98.

Correct use of soluble and straight cutting oils. (G21)

294-G. Recent Developments in Powder Processes. *Canadian Metals,* v. 16, July 1953, p. 42-44, 46-47.

Powder washing, cutting, skull reduction and applications. (G22)

295-G. Aircraft Forming Gets a Lift. Donna M. Ohm. *SAE Journal,* v. 61, Aug. 1953, p. 80-83.

Report on Panel on Forming held at SAE Aircraft Production Forum, Los Angeles, Oct. 1, 1952. Six methods for better and cheaper formed parts from Al. Photographs. (G general, Al)

296-G. Thread and Form Rolling. III. Characteristics of Thread Form. IV. Blank Specifications for Proper Rolling. C. T. Appleton. *Screw Machine Engineering,* v. 14, May, 1953, p. 37-41; June, 1953, p. 44-49.

Part III: Smoothness, accuracy, uniformity, diameters, taper, thread angle, lead, drunkenness, and roundness. Part IV: Preparing blanks and effect of size on rolling. Diagrams. (G11, G12)

297-G. Some Observations on the Metallurgy of the Deep Drawing of Metals. D. V. Wilson. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 621-629, 640.

Testing of drawing capacity, lubrication, and properties required in the finished component. Micrographs, photographs, graphs, diagrams. 8 ref. (G4)

298-G. Coating Halts High Coining Costs. *Steel,* v. 133, Aug. 10, 1953, p. 102.

Use of phosphate coating on blanks to prevent press breakdown. Photograph. (G3)

299-G. Line Grinding Solves Cutting Problems. H. J. Chamberland. *Steel,* v. 133, Aug. 17, 1953, p. 114, 117.

Technique of line grinding with a band machine. Photographs, diagram. (G18)

300-G. (Book.) Copper and Brass Pressings. Rev. ed. 81 p. Copper Development Assoc., Kendals Hall, Radlett, Herts, England.

Principal processes employed in the manufacture of strip and sheet products. Includes shearing; cupping; redrawing; miscellaneous pressing operations; expanding and contracting; bending and folding; coining; forming by flexible tools; spinning; joining and annealing; heat treatment; and pickling. Gives mechanical properties and composition of Cu and Cu alloy strip and sheet. (G general, J general, K general, L12, Q general, Cu)

301-G. Hydroforming. *Aircraft Production,* v. 15, Aug. 1953, p. 287-290.
High-pressure flexible die process. Diagrams, photographs. (G8)

302-G. Spar-Boom Bending. *Aircraft Production,* v. 15, Aug. 1953, p. 294-299.
New machine for controlled hot or cold forming of large extruded sections. (G6)

303-G. Metal-Cutting Chatter and Its Elimination. R. S. Hahn. *ASME, Transactions,* v. 75, Aug. 1953, p. 1073-1078; disc., p. 1078-1080.
Primary chatter, transitional instability and feedback effect. Photographs, diagrams, graphs. 6 ref. (G17)

304-G. Drawing Force Through Die. Circular Arc Type Die. Hiroshi Yamanouchi and Ikuhiko Hayashi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 46-47.
Comparison of drawing forces through circular arc and straight line type dies. (G4, CN)

305-G. On Impact Extrusion. Yuji Matsuura. *Castings Research Laboratory, Report,* no. 4, 1953, p. 48-49.
Experiment using inverse type of impact extruding. Graphs, diagram, photograph. (G5)

306-G. Three-Dimensional Flame Cutting. *Industry & Welding,* v. 26, Sept. 1953, p. 36-38, 76.
Procedure and apparatus. Photographs. (G22)

307-G. Forming, Cutting and Welding Procedures for Manufacture of 22"-42" O.D. Pipe. *Industry & Welding,* v. 26, Sept. 1953, p. 58-60, 62-63.
Photographs. (G general, K general, ST)

308-G. Carbon Arc-Air Torch Speeds Removal of 1500 Fillet Welds. *Industry & Welding,* v. 26, Sept. 1953, p. 87-88.
Use of new Arcair cutting and gouging torch. (G22, K1)

309-G. Gun Barrels Deburred and Cleaned by Liquid Honing. W. G. Patton. *Iron Age,* v. 172, Aug. 27, 1953, p. 102-103.
Photographs. (G19)

310-G. How to Prevent Distortion of Pierced Holes During Forming. Frederico Strasser. *Iron Age,* v. 172, Aug. 20, 1953, p. 134-135.
Diagrams. (G general)

311-G. The Hot Pressing of Metals. H. K. Barton. *Machinery (London),* v. 83, Aug. 7, 1953, p. 263-268.
Types of presses and dies. Diagrams. (G1, F22)

312-G. The Spark Erosion of Hard Metals. *Machinery Lloyd (Overseas Ed.),* v. 25, Aug. 1953, p. 97-98.
Apparatus to machine hard metals. Photograph. (G17)

313-G. Press Trimming Large Diecastings. H. K. Barton. *Mechanical World and Engineering Record,* v. 133, Aug. 1953, p. 348-349.
Construction of presses and dies. Diagrams. (G15)

314-G. Early Experiments in the Cold Extrusion of Steel. H. J. Pessl and H. H. Hauttmann. *Metal Progress,* v. 64, July 1953, p. 97-102.
History of cold extrusion. Pressure requirements, effect of lubricants and use of phosphate coatings. (G5, ST)

315-G. Tool Wear vs. Metal-Cutting Temperatures. A. O. Schmidt. *Metal Progress,* v. 64, July 1953, p. 186, 188.
Previously abstracted from *Tool Engineer.* See item 369-G, 1952. (G17, S16, CN, Mg)

316-G. Recommended Procedures for Grinding Titanium Alloys. *Metal-Working,* v. 9, Sept. 1953, p. 16-19.
Extract from "Grinding Recommendation for Titanium", a technical bulletin issued by Norton Co. Types of wear, grinding ratio, grinding fluids and quality production. Tables. (G18, Ti)

317-G. A Guide for Selecting the Proper Cutting Fluids. *Metal-Working,* v. 9, Sept. 1953, p. 20-21.
Extract from "Fluids and Facts for Metal-Working", a manual issued by the Standard Oil Co. of Indiana. Includes table. (G21)

318-G. Dimples Make the Difference in Aluminum Heat Exchangers. *Modern Metals,* v. 9, Aug. 1953, p. 44, 46, 50.
Process to increase heat transfer efficiency. Photographs. (G2, Al)

319-G. An Investigation on Peening. P. L. Calamari, F. J. Crum, and G. W. Place. *Welding Journal,* v. 32, Aug. 1953, p. 387s-402s.
Presented at Thirty-Third National Fall Meeting, AWS, week of Oct. 19, 1952, Philadelphia, Pa. Evaluates effects of peening. Results of modified Charpy impact test and hardness surveys. Graphs, tables, photographs, micrographs. 2 ref. (G23, Q6, Q29, CN)

320-G. Forming Tool Can Exert 4800-Ton Force. William P. Brotherton. *Western Machinery and Steel World,* Aug. 1953, p. 92-94.
Radial expanding tool for fabricating Al and stainless steel sheet metal parts for jet engines. Photographs. (G9, Al, SS)

321-G. Diamonds in Industry. *Western Machinery and Steel World,* v. 44, July 1953, p. 81-82; Aug. 1953, p. 96-97.

Use of diamonds as abrasives. Photographs. (G18)

322-G. Machinability of Cast Iron. W. H. Moore. *Western Machinery and Steel World,* v. 44, Aug. 1953, p. 99-105.

Controlled microstructure, variations in castings, test for S, even O_2 distribution, graphite disposition and control of constitution. Micrographs, photographs. (G17, CI)

323-G. Spin-Dimpling. *Aircraft Production,* v. 15, Sept. 1953, p. 314-317.

Spin-dimpling process and equipment. Diagrams, photographs. (G2)

324-G. Practical Approach to Optimum Machining. I. Chip Studies Reveal What Happens During Turning. II. Forces and Vibration on the Tool Affect Its Life. III. Chip-Tool Temperature Affects the Cutting Speed. A. B. Albrecht. *American Machinist,* v. 97, May 25, 1953, p. 121-125; June 8, 1953, p. 142-145; June 22, 1953, p. 130-133.

Micrographs and photographs. (G17, TS)

325-G. Machinability of High-Phosphorus Irons Improved by Ladle Additions. Edward A. Loria. *American Machinist,* v. 97, Aug. 31, 1953, p. 92-95.

How effects of additives on microstructures permits high phosphorus irons to be machined. (G17, Fe)

326-G. Cope Talks on Draw Dies. V. Layout of Deep-Drawn Shells Follows Certain Steps. Stanley R. Cope. *American Machinist,* v. 97, Sept. 14, 1953, p. 126-129.

Deep drawing of metal shells. Diagrams. (G4)

327-G. Be Cagey With Titanium. John A. Boyd. *American Machinist,* v. 97, Sept. 14, 1953, p. 129.

Importance of proper machining methods. (G17, Ti)

328-G. Mist Cooling. Ben C. Brosheer. *American Machinist,* v. 97, Sept. 14, 1953, p. 137-152.

Applications of spray cooling during machining. Coolants, theory and case studies on various machines. Tables, photographs. (G21)

329-G. Cope Talks on Draw Dies. IV. Shallow Shells Require Careful Die Design. Stanley R. Cope. *American Machinist,* v. 97, Sept. 14, 1953, p. 164-166.

Action of dies in blanking and drawing medium and large shells. Diagrams. (To be continued.) (G4)

330-G. How to Grind Carbides Six Times as Fast With Less Than 1% Diamond Wheel Wear. John A. Mueller. *American Machinist,* v. 97, Sept. 28, 1953, p. 122-125.

Electrolytically assisted grinding of cemented carbides. Diagrams, table, photographs. (G18, SG-j)

331-G. Cutting Abrasive Costs in Body Plant. J. R. O'Neil and W. J. Swallow. *Automotive Industries,* v. 109, Sept. 1, 1953, p. 66-68, 100, 102, 104.

Abrasive techniques and equipment which provide maximum efficiency at lowest cost. Photographs. (G18)

332-G. Forming Exhaust Pipes With Timesaving Equipment. *Automotive Industries,* v. 109, Sept. 1, 1953, p. 72, 110, 112.

New 20-ton vertical hydraulic bending press used to produce exhaust and tail pipe bends at a production rate 50% faster than that achieved with former equipment. Photographs, table. (G6)

333-G. The Manufacture and Manipulation of Seamless Tubes. II. Accles and Pollock. *Engineering,* v. 176, Aug. 14, 1953, p. 193-195.

Machining of the tubes, equipment used and uses of the tubes. Photographs. (G17, F26)

334-G. Factors to Consider When Purchasing Double-Action Presses. Gordon M. Sommer. *Finish,* v. 10, Sept. 1953, p. 21-22.

Single- and double-action presses. Data on die cushions for both. Diagrams. (G1)

335-G. Stretch Wrap Forming Cuts Fabricating Costs. I. L. F. Spencer. *Iron Age,* v. 172, Sept. 3, 1953, p. 120-124.

Process, uses and advantages of stretch wrap forming. Diagrams, photographs, tables. (G9)

336-G. Stretch Wrap Forming Cuts Fabricating Costs. II. L. F. Spencer. *Iron Age,* v. 172, Sept. 10, 1953, p. 163-167.

Equipment and process. Photographs, diagrams. 5 ref. (G9)

337-G. How to Select the Proper SFM in Milling Operations. H. A. Frommelt. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 151-158, 160.

Nature, calculation and selection of surface foot rate for milling operations. Tables. (G17)

338-G. New Diamond Wheel Grinds to a Depth of ⅛ In. in Carbide Without Loading. William F. Schleicher. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 229-232.

Properties and action of wheel. Photographs. (G18)

339-G. Removing Wrinkles in Formed Aluminum Sheets. Gilbert C. Close. *Machinery,* v. 60, Sept. 1953, p. 188-190.

New "clip" device attached to the sheet to be formed, reducing wrinkling. Diagrams, photographs. (G1, Al)

340-G. Electrolytic Grinding. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 29, 1953, p. 68-70.

Process and its advantages. Diagrams. (G18)

341-G. The Electro Erosion Process. J. L. Adcock. *Machinery* (London), v. 83, Aug. 21, 1953, p. 355-359.

Electrolytic, electro arcing, and electro sparking methods for cutting metals. Photographs. (G17)

342-G. High Speed Machining of Aluminium Alloy Castings. *Machinery* (London), v. 83, Sept. 11, 1953, p. 524-526.

Advantages of increased running speed of milling machines. Photographs, diagrams. (G17, Al)

343-G. Electrospark Machining. C. R. Alden. *Mechanical Engineering,* v. 75, Sept. 1953, p. 701-705.

Machining of conductive work materials by direct application of electric sparks. Diagram, photographs. 14 ref. (G17)

344-G. Press-Forming Process. *Metal Industry,* v. 83, Aug. 28, 1953, p. 169-170.

Press-forming technique which permits the use of a rubber pressure pad as a female die and an inexpensive form block as a punch. Photograph, diagrams. (G8)

345-G. Grinding Carbide Tools With Electrolytic Assistance. Newman W. Thibault and Bertil H. Anderson. *Metal Progress,* v. 64, Aug. 1953, p. 161-166.

Diamond-wheel grinding of cemented carbides. Equipment and results. Tables, photographs. (G18, SG-j, C-n)

346-G. Remarks in Connection With the Problem of the Two-Dimensional Thermal Flow in the Vicinity of a Tool Cutting Edge. E. Bickel. *Microtecnic* (English Ed.), v. 7, no. 3, 1953, p. 134-135.

Translated from the German. Mathematical analysis. Diagrams. (G17)

347-G. Study of External Cylindrical Grinding. H. Opitz. *Microtecnic* (English Ed.), v. 7, no. 4, 1953, p. 162-170.

Translated from the German. Quantitative relationships between infeed, table speed, lateral feed, speed of work, speed of grinding wheel, scratch depth, peripheral force and wheel life. Photograph, diagrams, graphs. (G18, ST)

348-G. Press Brakes for Press Work. *Modern Industrial Press,* v. 15, Aug. 1953, p. 26, 28, 32, 36, 50, 52, 56.

Pressing and forming equipment and methods. Photographs. (G1)

349-G. Simplified Production of Steel Equipment. Howard E. Jackson. *Modern Industrial Press,* v. 15, Aug. 1953, p. 38, 40, 42, 44, 46, 48.

Pressing and forming equipment and procedure. Photographs. (G1, ST)

350-G. Punch Presses Turn Out Quality Product at West Wind Corporation. Howard E. Jackson. *Modern Industrial Press,* v. 15, Sept. 1953, p. 36. 38, 40, 42, 44.

Design, construction, manufacture and general use of the West Wind ventilating fan. Photographs. (G2)

351-G. Press Forming Magnesium Alloy Sheet and Plate. Harry Wilkens Perry. *Modern Industrial Press,* v. 15, Sept. 1953, p. 52, 54, 56, 58.

Differences in fabrication of Mg and other metals, emphasizing advantages of the former. Photographs, diagram. (G1)

352-G. Forming Steel With Plastics Dies. F. B. Stanley. *Modern Plastics,* v. 31, Sept. 1953, p. 109-112, 114.

Forming techniques, glass cloth for faces of dies and curing. Photographs. (G general, ST)

353-G. Big Press Takes on New Dimensions. *Steel,* v. 133, Sept. 7, 1953, p. 130.

Throatless press suspended from single concrete press structure. Diagram, photographs. (G1)

354-G. Press Brake Forming As a Production Tool. Lester F. Spencer. *Steel Processing,* v. 39, Sept. 1953, p. 441-449, 468-469.

Flexibility of performance, simplification of tool design, and low cost tooling are advantages. Photographs, tables. 8 ref. (G1)

355-G. Wear of Carbide Tools. Its Effect on Surface Finish and Dimensional Accuracy. A. J. Pekelharing and R. A. Schuermann. *Tool Engineer,* v. 31, Oct. 1953, p. 51-57.

Results of various machining operations on parts made of typical steels using single point carbide tools. Diagrams, charts. 3 ref. (G17, Q9, C-n)

356-G. Roll Forming. Simple Method for Designing Rolls. Elmer J. Vanderploeg. *Tool Engineer,* v. 31, Oct. 1953, p. 59-65.

Principles and rules. Steps in forming a typical shape. Diagrams, photographs. (G11)

357-G. Laboratory Precision of Riverbank Production Line Spells Quality Control. Robert T. Reinhardt. *Western Metals,* v. 11, Sept. 1953, p. 51-55.

Imposing array of 65 presses, precise heat treat controls, and West's first major spheroidizing plant combine to produce wide range of artillery shell cases at Norris-Thermador plant. Photographs. (G general, T2)

358-G. Standardized Carbide Fastener Nib Dimensions Meet Most Cold Heading Needs. A. Earle Glen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 885-886, 928-930.

Use of cold heading dies and use of die nibs of standardized dimensions for more economical production. Diagrams. (G10)

359-G. (French.) **The Dissolution Potential of Chromite Allovs After Abrasion in an Inert Atmosphere.** Henry Hatwell. *Comptes rendus,* v. 236, no. 19, May 11, 1953, p. 1881-1883.

Surface measurements made of various metals after abrading in a pure argon atmosphere to remove oxide layers. Table, diagram, graph. (G18, Al, U, CN, Zr)

360-G. (French.) **Variation of the Internal Energy of Metals Caused by Cold Working.** Félix Eugene. *Comptes rendus,* v. 236, May 21, 1953, p. 2071-2073.

Problem of mechanical energy consumed by the tool during cutting of metal. (G17, P12)

361-G. (French.) **Machining of Stainless Steel.** Jean Daurat. *Métallurgie et la construction mecanique,* v. 85, no. 7, July 1953, p. 557-561.

Turning and screw cutting. Diagrams, tables. (To be continued.) (G17, SS)

362-G. (German.) **Machinability of Light Metals.** W. Späth. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 292-297.

Service life versus cutting speed. Short-time tests were used. Graphs, tables. 9 ref. (G17, Al)

363-G. (German.) **New Process for Facilitating Deep Drawing of Aluminum Alloys.** *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 607.

Protective pretreatment. Photograph. 2 ref. (G4, Al)

364-G. (German.) **Effect of Steel Production Method on Deep-Drawing Characteristics of Sheets.** Friedrich Eisenkolb and Theo Brüggemann. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 967-970.

Influences of melting practice and C content were studied on open-hearth, electric and Bessemer steels. Photographs, micrographs, graphs. (G4, D general, CN)

365-G. (Book.) **Fabricated Materials and Parts.** T. C. Du Mond. 332 p. 1953. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $6.50.

Discusses methods of producing small industrial parts. Compares costs, materials, advantages and limitations of the processes, design factors, size ranges and tolerances which can be met. (G general)

366-G. Automatic Stamping and Welding of Sheet Metal Parts. *Automotive Industries,* v. 109, Oct. 1, 1953, p. 48-49.

Equipment. Photographs. (G3, K general)

367-G. 40,000 Flame Cutting Machines Speed Metal Fabrication. *Industry & Welding,* v. 26, Oct. 1953, p. 74-76, 79, 138-139.

Wide variety of oxy-acetylene cutting operations. Photographs. (G22)

368-G. Machining Nickel Alloy Steels. G. P. Witteman. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 164-170, 172-174, 176, 178, 180, 185-186, 188, 190.

Machinability in respect to hardness and microstructure. Micrographs, tables, diagrams, photograph. (G17, AY)

369-G. Kneading Die Produces Steel Type Rapidly. Herbert Chase. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 194-195, 198.

Design and operating characteristics of die for making electric typewriter type. Photographs. (G3)

370-G. New Trimmer Saves Operation, Lowers Tooling Costs. Paul Anstedt. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 203-205.

Design and operating characteristics. Photographs. (G15)

371-G. Light Machining Operations on Die Castings. H. K. Barton. *Machinery (London),* v. 83, Sept. 25, 1953, p. 631-638.

Flash removal, dimensional accuracy and special features. Diagrams. (G17, E13)

372-G. A Large Boring Mill With Special Features. *Machinery (London),* v. 83, Oct. 2, 1953, p. 682-689.

Plant layout, equipment and procedure. Photographs, diagrams. (G17)

373-G. Where Shot Peening Can Be Used to Advantage. John L. Everhart. *Materials & Methods,* v. 38, Oct. 1953, p. 110-113.

Applications in straightening and forming, decreasing stress-corrosion cracking, reducing porosity in castings and testing quality of plating. Photographs, graph, table. (G23)

374-G. Spun Metal Shapes Meet Tough Requirements. Herbert Ed-

lund. *Materials & Methods*, v. 38. Oct. 1953. p. 134-136.

Spinnings are finding increased use where limited numbers of large parts are required. Photographs. (G13)

375-G. Impact Extrusion Research. *PERA Bulletin*, v. 6, Sept. 1953. p. 506-512.

Describes process and applications. Diagrams. 48 ref. (G5)

376-G. (French.) **Machinability of Stainless Steel.** Jean Daurat. *Métallurgie, et la construction mécanique*, v. 85, no. 8, Aug. 1953. p. 619-621.

Milling procedures. (To be continued.) (G17, S8)

377-G. (German.) **"ESA", A New Electric Arc-Oxygen Cutting Process.** E. Brünn and F. Erdmann-Jesnitzer *Schweisstechnik*, v. 7, no. 6. June 1953. p. 68-70.

Principle, procedure and equipment; shows process is superior and more economical than other cutting methods. Photographs. (G22)

378-G. (German.) **Systematic Machining Processes.** Walter Schmidt. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 20, July 11, 1953. p. 689-695.

Theoretical concepts of processes of shaping by cutting. Diagrams. 5 ref. (G17)

379-G. Working With Titanium. Norman S. Currey. *Aviation Age*, v. 20, Oct. 1953. p. 134-139.

Technical and financial aspects of forming, welding and machining. Tables, photographs. (G general, K general, Ti)

380-G. Radial Forming Aluminum. *Modern Metals*, v. 9, Oct. 1953, p. 46.

New expansion forming technique which produces fewer defects than hammer deformation or spinning. Method is also used on stainless steel. Photograph. (G9, Al, S8)

381-G. The Forming of Aluminum Sheet. I. The Characteristics of the Metal. H. Hinxman. *Sheet Metal Industries*, v. 30, no. 318, Oct. 1953. p. 847-850, 878.

Fundamental concepts of usage of Al and Al alloy sheet. Table, photograph. (To be continued.) (G general, Al)

382-G. New Forming Process. Thomas A. Dickinson. *Sheet Metal Industries*, v. 30, no. 318, Oct. 1953. p. 899-901, 906.

Rubber pad process which minimizes tooling costs and destructive sound vibrations. Photographs, diagram. (G8)

383-G. Impact Extrusion of Magnesium. *Steel*, v. 133, Oct. 26, 1953. p. 114-116.

Metal flows at 350 to 500° F. and at about half the pressure needed for aluminum. Reports light weight products resist corrosion and have good electrical and heat conductivity. Photographs, diagram, graph (G5, Mg)

384-G. Needle Tube Production. *Steel*, v. 133, Nov. 2, 1953. p. 90-91.

Procedure demanding sharp tolerances and appropriate heat treatment. Photographs. (G general)

385-G. Smooth Out Your Disc Grinding Problems. J. Karl McLaughlin. *Steel*, v. 133, Nov. 2, 1953. p. 92-94

Greater efficiency from abrasive disks by eliminating five common grinding errors. Photographs. (G18)

386-G. Magnesium Forming. I. General Considerations. Francis L. Coenen. *Tool Engineer*, v. 31, Nov. 1953, p. 43-49.

General rules, based on production data, that may serve as guides in planning processes and equipment. Photographs, tables, graphs, diagrams. (To be continued.) (G general, Mg)

387-G. Mechanics of Tool Engineering. II. Hole Engineering. Andrew E. Rylander. *Western Machinery and Steel World*, v. 44, Oct. 1953, p. 85-90.

Precision drilling, reaming and grinding. Diagrams, photographs. (G17, G18)

388-G. Tube Forming Techniques Pay Off Big Dividends at Ryan. William P. Brotherton. *Western Machinery and Steel World*, v. 44, Oct. 1953. p. 96-97.

Unusual techniques of forming odd-shaped sections from tubing has reduced costs and increased production. Photographs. (G6)

389-G. (German-French.) **The Effect of Impurities in Free-Machining Brass.** *Pro-Metal*, v. 6e, no. 34, Aug. 1953. p. 211-218.

Experiments show that up to 0.35% iron or 0.2% aluminum do not reduce machinability of brass or life of the cutting tool. Diagrams, table, graph. (G17, Al, Fe, Cu)

390-G. (German.) **Influence of Silicon in Aluminum on Longevity of Cutting Tools.** H. Lindqvist. *Aluminium*, v. 29, no. 9, Sept. 1953. p. 375-377.

Data from machining aluminum alloys containing silicon. Graphs, diagram. (G17, Al, Si)

391-G. (German.) **Increasing Output by Cold Pressing Light Metals.** H. Hornauer. *Aluminium*, v. 29, no. 10, Oct. 1953, p. 405-413.

Shows that work hardening can

be avoided. Greater economy of tools and materials and lowered assembly costs realized by dispensing with the annealing operation. Diagrams, graphs, photographs, tables, micrographs. 12 ref. (G1, Al, Mg, Cu, Si)

392-G. (German.) **Cold Extrusion Molding.** *F. Mass. Metall*, v. 7, nos. 17-18, Sept. 1953, p. 695-702.

Basic processes, choice of materials, preparatory procedures and molding. Diagrams, graph. (G5, Al, Zn, Cu, ST)

393-G. (German.) **Influence of Certain Impurities on Machining Brass Stock.** K. Schimz. *Metall*, v. 7, nos. 17-18, Sept. 1953, p. 700-701.

Influence of iron and aluminum. Tables. Ref. (G17, Al, Cu, Fe)

394-G. (German.) **Grinding Agents for Hard-Metal Tools.** *Metall*, v. 7, nos. 17-18, Sept. 1953, p. 701-703.

Use of diamonds as abrasives. Table. (G18)

395-G. (German.) **Relationship Between Machinability and Other Properties of Materials.** Franz Kapatz. *Stahl und Eisen*, v. 73, no. 18, Aug. 27, 1953, p. 1169-1174.

Development and forms of wear and means of influencing it. Chip shapes, faster cutting speeds, embrittlement, increased material strength and reduced friction coefficients considered. Photographs, graphs. 15 ref. (G17, ST)

396-G. (German.) **Stamping of Rolled Material in Hot Saws, Hot Shears, and Dressing Machines.** Herbert Zimmer. *Stahl und Eisen*, v. 73, no. 18, Aug. 27, 1953, p. 1174-1176.

Significance of stamping methods and how they are carried out. Photographs, diagrams. (G3)

397-G. (Russian.) **Anodic-Mechanical Grinding of Circular Cutting Tools With Tips of Hard Alloys.** G. P. Bessarchuk. *Stanki i Instrument*, v. 24, no. 4, Apr. 1953, p. 20-21.

Method results in absence of cracks in tips, cleaner working surfaces and higher productivity. Diagrams. (G18, TS)

398-G. (Russian.) **Redesign of Metal Cutting Machines for Anodic-Mechanical Work.** G. A. Karasik. *Stanki i Instrument*, v. 24, no. 6, June 1953, p. 9-17.

Changes necessary on lathes and milling machines. Diagrams, tables, photographs. (G17)

399-G. (Russian.) **Turning of Parts Built-Up With "Sormaite".** E. A. Belousova and A. Ia. Malkin. *Stanki i Instrument*, v. 24, no. 5, May 1953, p. 10-13.

Composition and mechanical properties of a 12-25% Cr-Fe alloy used to build up wear resistant surfaces. Techniques of machining built-up parts are presented. Tables, diagrams. (G17, L24, Q9, Cr, Fe)

400-G. Cope Talks on Draw Dies. VI. When You Redraw Shells Observe Certain Rules. Stanley R. Cope. *American Machinist*, v. 97, Oct. 26, 1953, p. 120-123.

Three general classes of redrawing dies and choice of correct tools. Diagrams. (To be continued.) (G4)

401-G. A Handbook of Workholding-Devices. I. Rotating Devices. H. E. Linsley. *American Machinist*, v. 97, Oct. 26, 1953, p. 129-144.

Some conventional and unusual examples and typical applications. Photographs, diagrams. (G17)

402-G. Spinning vs Drawing. II. J. Lenbridge. *Canadian Metals*, v. 16, Oct. 1953, p. 48, 50.

Evaluation of the above, which can compete with or supplement each other according to economics involved in individual cases. Table. (G13, G4)

403-G. Lubrication in Metal Cutting. *Canadian Metals*, v. 16, Oct. 1953, p. 62, 64.

Evaluation of part played by cutting fluids in machining operations and some causes of tool failure. Graphs, table. (G21)

404-G. The Grinding of Steel. XII. Grinding Twist Drills, Counterbores, Cutters, and Reamers. *Edgar Allen News*, v. 32, Oct. 1953, p. 229-230.

Sharpening of 18 metalcutting tools. Diagrams. (To be continued.) (G18)

405-G. Electric Spark Erosion as Applied to Metal Machining. D. W. Rudorff. *Engineers' Digest*, v. 14, Oct. 1953, p. 373-377.

Equipment, principles and techniques of the "Sparcatron" process. Photographs, diagrams. (G17)

406-G. Application of External Dust Control to a Standard 24-In. Pedestal Grinder. I. Dust Control System. W. H. White. **II. Dust Observations and Determinations.** W. B. Lawrie. *Foundry Trade Journal*, v. 95, Oct. 15, 1953, p. 481-487.

Work which led to the above, including observations of the loci of dust clouds. Series of dust counts as indication of efficiency of system. Photographs, diagrams, tables. 2 ref. (G18, A5)

407-G. How Do Boron Steels Compare in Machinability? Norman Zlatin, J. F. Kahles and W. H. Friedlander. *Iron Age*, v. 172, Oct. 29, 1953, p. 94-97.

Tests comparing machining char-

acteristics with equivalent standard alloy steels. Graphs, tables. (G17, AY)

408-G. Calculations on Sheet-Drawing Under Back Tension Through a Rough Wedge-Shaped Die. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 2, Oct. 1953, p. 39-42.

Based on the Hill-Tupper theory, a single empirical formula expressing drawing stress as a function of die semi-angle, coefficient of friction, reduction and back-tension, is derived. Graphs. 5 ref. (G4)

409-G. Applications of Unit-Type Automatic Transfer Machines. *Machinery (London),* v. 83, Oct. 9, 1953, p. 699-711.

Equipment, plant layout and procedures. Photographs, diagrams. (To be continued.) (G17)

410-G. The Design of Follow-On Tools for Chappuis Automatic Presses. Jacques A. Chappuis. *Machinery (London),* v. 83, Oct. 9, 1953, p. 712-716.

Use of a single machine to produce several press operations. Photograph, diagrams. (G1)

411-G. Lubrication in the Cutting of Metals. Antoni Niedzwiedzki, *Machinery (London),* v. 83, Oct. 9, 1953, p. 717-721, 741.

Functions and properties of lubricants. Effects of friction when cutting metals. Diagrams, photograph. 19 ref. (G21)

412-G. Continental Developments in High-Speed Hobbing. *Machinery (London),* v. 83, Oct. 9, 1953, p. 733-735.

Advantages of improved hob life and outstanding production savings. Photographs. (G17)

413-G. Greater Structural Efficiency for U. S. Airpower Provided by Larger Aluminum Extrusions. George E. Moni. *Western Metals,* v. 11, Oct. 1953, p. 58-60.

Design and operation of two new presses and their advantages over "bits and pieces" fabrication. Photographs, diagram. (G5, F24, Al)

414-G. Military Tank Torsion Bars Shot Peened for Fatigue Resistance. Edgar Brooker. *Western Metals,* v. 11, Oct. 1953, p. 61-63.

Equipment, techniques and benefits of process. Photographs. (G23)

415-G. Machining Costs of Iron Castings Cut With Cupola Deoxidation Process. *Western Metals,* v. 11, Oct. 1953, p. 66-68.

Technique, requirements of good deoxidizer and effects of processing on microstructure. Photographs, graphs. (G17, E10, CI)

416-G. (French-German.) **The Hot Pressing of Copper Alloys.** *Pro-Metal,* v. 6e, no. 34, Aug. 1953, p. 203-210.

Materials, dies, die design and advantages of hot pressing methods. Diagrams, photographs. (G1, Cu)

417-G. (French.) **Shot Peening in the Steelmaking Industry.** Guy Giudicelli. *Métallurgie et la construction mécanique,* v. 85, no. 9, Sept. 1953, p. 723-729.

Difference between shot peening and descaling. Machinery and methods for shot peening and its specialized application. Photographs. (G23, L10, ST)

418-G. (German.) **Damage by Grinding and Polishing Materials.** Walter Burkart. *Metalloberfläche,* Ausgabe B, v. 5, no. 9, Sept. 1953, p. 137-138.

Behavior of quartz, natural corundum, tripoli earth, iron oxide, chromium oxide and clay. 2 ref. (G18, L10)

419-G. (Russian.) **Selection of Punch Tip Radius for Free Bending.** I. P. Renne. *Vestnik Mashinostroeniia,* v. 33, no. 5, May 1953, p. 35-41.

Effect of tip radius on radius of curvature of articles formed from various materials. Diagrams, graphs, table. 3 ref. (G6)

SECTION H

POWDER METALLURGY

1-H. Planning an Economically Sound In-Plant Powder Metal Production Setup. Lawrence H. Johnson. *Modern Industrial Press,* v. 14, Nov. 1952, p. 24, 26, 28.

Various advantages of powder metallurgy over other competing methods of fabrication. (H general)

2-H. Austria Is Host to World Congress on Powder Metallurgy. Henry H. Hausner. *Metal Progress,* v. 62, Nov. 1952, p. 79-83.

Brief summaries of following papers presented June 22-26, 1952, at Reutte (Tyrol), Austria: "Properties of Hard Metal Alloys", C. Ballhausen; "High-Temperature Materials by Silicizing Tungsten and Molybdenum", E. Fitzer; "Preparation of Purest Titanium Carbide", G. F. Huettig; "Formation of Solid Solutions of Hard Metals", R. Kieffer; "Investigations on Ternary Systems Me_1-Me_2-B and a Discussion of the Relative Strength of the Bond Transition Metal, Boron", R. Kiessling; "Ternary System Tungsten-Carbon-Cobalt", John T. Norton; "Development of High-Strength Heat Treatable Products From Alloy Powders", G. J. Comstock and F. H. Clark; "Developments in the Powder Metallurgy of Aluminum", A. von Zeerleder; "Effect of Lattice Changes on the Sintering Process", H. H. Hausner; "Some Observations on the Mechanism of Liquid Phase Sintering", F. V. Lenel; "Microhardness Test as an Auxiliary in Examining Sinter Changes in Complex Systems", E. M. Onitsch-Modl; "Contributions to the Physical Analysis of the Sintering Process", G. Ritzau; and "New Concepts of Diffusion in Metals", W. Seith.
(H general)

3-H. Determination of the Pore-Size Distribution in Porous Metal Bodies. P. R. Marshall. *Nature,* v. 170, Nov. 1, 1952, p. 761.

Brief theoretical analysis. Procedure is mentioned. (H11)

4-H. The Sintering of Powders and Diffusion. R. S. Barnes. *Philosophical Magazine,* ser. 7, v. 43, Nov. 1952, p. 1221-1224.

Applies result of recent interdiffusion experiments using solid sandwiches of metals which form a complete series of solid solutions, to the density behavior of mixed powders which also form solid solutions, and to the fundamental problem of the mechanism of the sintering process. Cu-Ni, brass-Cu, and Al-bronze plus Cu sandwiches were used in experiments. (H15, N1, Cu, Ni, Al)

5-H. Some Properties of Aluminium Flake Powder. 4. The Degree of Flakiness. G. W. Wendon. *Paint Manufacture,* v. 22, Dec. 1952, p. 455-459, 472.

Pigment behavior, flakiness studies, and classification methods. Graphs and tables. (H11, Al)

6-H. Floating Die Table Equalizes Press Action. George Karian. *Iron Age,* v. 170, Dec. 25, 1952, p. 78-80.

Savings over large-size, dual punch press for compacting metal powders. (H14)

7-H. Excellent Products of Aluminum Powder Metallurgy. John P. Lyle, Jr. *Metal Progress,* v. 62, Dec. 1952, p. 109-112.

Tensile properties, and results of creep and fatigue tests on Al and Al alloys made by powder metallurgy. Tables and graphs.
(H general, Q general, Al)

8-H. Sintering of Ultrafine Ferromagnetic Powders. N. I. Ananthanarayanan and J. F. Libsch. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 79-80.

Experiments were restricted to powders prepared by low-tempera-

ture reduction of finely divided jeweller's rouge in purified H_2. 11 ref. (H10, Fe)

9-H. How Powder Metallurgy Is Progressing. H. W. Greenwood. *Metlurgia,* v. 46, Dec. 1952, p. 289-292, 298.

Metal powders of Fe, Cu, stainless steel, and Al; pressing and sintering, bearings, high-temperature alloys and magnetic materials. 3 ref. (H general, Fe, Cu, SS, Al, SG-h, n, p)

10-H. Technology of Titanium. H. W. Worner. *Australasian Institute of Mining and Metallurgy, Proceedings,* New Series, No. 158-9, 1950, p. 89-104.

Consolidation of powdered or spongy Ti, plus brief description of mechanical working, annealing, joining and other techniques. (H general, G general, J23, K general, Ti)

11-H. Aluminum in Powder Metallurgy. A. von Zeerleder. *Modern Metals,* v. 8, Jan. 1953, p. 40, 42, 44.

Two methods of preparing Al powder, mechanical properties, and applications. Micrographs and graphs. (H10, H11, T general, Al)

12-H. Powdered Magnetic Cores. W. J. Polydoroff. *Tele-Tech,* v. 12, Feb. 1953, p. 69-71, 112, 114, 116, 118, 120, 128, 131-132.

Measurement techniques for magnetic materials aid research and improve manufacturing methods. Factors affecting loss and permeability are analyzed. Graphs. 15 ref. (H11, SG-n, p)

13-H. (French.) **Chemical Properties of Titanium-Aluminum Alloys.** Jean Cueilleron and Claude Pascaud. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 17, 1952, p. 1220-1221.

Chemical methods for separating $TiAl_3$ from alloys with less than 53% Ti, and for selective attack of Al in alloys with 53-65% Ti thus producing Ti powder. (H10, Ti)

14-H. (German.) **Surface Activity and Sintering of Fine Powders.** Josef Hinnüber and Otto Rüdiger. *Archiv fur das Eisenhuttenwesen,* v. 23, Nov.-Dec. 1952, p. 475-482.

Electron microscope, X-ray, electron emission, oxidation and gas evolution studies were made on four W powders. Previous data on recrystallization of WC nuclei are refuted. Data are tabulated and charted. 18 ref. (H11, W)

15-H. (German.) **On the Shrinkage of Powders of Nonthermoplastic Metallic Substances.** Walther Dawihl. *Archiv fur das Eisenhuttenwesen,* v. 23, Nov.-Dec. 1952, p. 483-488.

Lists all regularities determined thus far on "liquid flow" or slip shrinkage. The concept of shrinkage, speed of shrinkage, influence of additions, and importance of the surface tension of added substances. 24 ref. (H11)

16-H. (German.) **Preparation of Powdered Alloys at Low Temperature and Their Investigation on the Basis of Lattice Disturbances of the Thermal Fluctuation Type.** F. Hund. *Zeitschrift fur Elektrochemie Berichte der Bunsengesellschaft fur Physicalische Chemie,* v. 56, No. 7, 1952, p. 609-612.

The metals or alloys were made from pure Fe and Ni oxalate and mixed oxalates of both metals by decomposition in N_2 and reduction in H_2 at 350 or 500° C. Lattice constants were determined by asymmetric method. Irregular lattice disturbances of the γ phase were determined and compared with temperature disturbances caused by thermal movement. 12 ref. (H10, M26, Ni, Fe)

17-H. Preforming Complex Carbide Shapes Lowers Costs. F. J. Lennon, Jr. *Iron Age,* v. 171, Feb. 5, 1953, p. 153-155.

Forming and shaping carbide tools can be done economically and quickly before final sintering, since the pieces are in a soft, chalk-like state. Photographs. (H14, C-n)

18-H. Magnetic Powder Cores. D. F. W. Champion and E. G. Wilkins. *Wireless World,* v. 59, Feb. 1953, p. 83-86.

Method of preparing magnetic powder, insulation, and core fabrication. (H10, T1, Fe)

19-H. (Book.) **Tablet Making.** Arthur Little and K. A. Mitchell. 123 pages. 1952. Northern Publishing Co., Ltd., 37, Victoria St., Liverpool 1, England. 15/-net.

Comprehensive description of all processes in tablet making, including mixing, granulating, drying, compressing, coloring, and coating, for all types of tablets, including powder metal compacts, together with details of plant and equipment. (H14)

20-H. How Powder Metal Is Made. Samuel Bradbury. *Industrial Heating,* v. 20, Feb. 1953, p. 252, 254.

Atomizing of Pb, Sn, Al, and brass; chemical reduction of Cu, Fe, and W; and electrolytic deposition of Fe, Cu, and Ag. (H10, Pb, Sn, Al, Cu, Fe, W, Ag)

21-H. Powder Metallurgy in Metal lurgical Research. W. R. Pitkin and D. J. Jones. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 157-161.

Method for studying properties of certain metals and alloys. Tungsten for lamp filaments, alloys for tube

filaments, and alloys having specific properties. Micrographs.
(H general, W, Ni, Cu)

22-H. The Measurement of the Relative Hardnesses of Fine Powder Particles. J. B. Matthews. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 279-285.

Method depends on decrease in specular reflectivity produced by bombarding the reflecting surface with powder particles. Data for Al powders are tabulated. (H11, Al)

23-H. Zirconium Now Fabricated by Powder Metallurgy Methods. Herbert S. Kalish. *Materials & Methods,* v. 37, Feb. 1953, p. 101-103.

Shows that sintered Zr is readily cold worked, reduces machining costs, minimizes scrap loss, and simplifies alloying. Micrographs and graphs. (H general, Zr)

24-H. Modern Techniques Produce Shell Cores. *Steel,* v. 132, Feb. 23, 1953, p. 92, 94.

Powder metallurgy techniques used in producing 4-lb. cores for 76-mm., and 8-lb. cores for 90-mm. shells. (H14, C-n)

25-H. Measurement of Particle Sizes in Opaque Bodies. R. L. Fullman. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197. 1953. p. 447-452.

Methods developed for analysis of particle sizes when particles are in form of spheres, plates, or rods. Diagrams. 11 ref. (H11)

26-H. New Ternary Boride Compounds. Robert Steinitz and Ira Binder. *Powder Metallurgy Bulletin,* v. 6, Feb. 1953, p. 123-125.

Compounds with physical properties which make them desirable ingredients in cutting tool materials. (H11, T6, Co, Fe, Ni, Mo, B)

27-H. The Pseudo-Binary System ZrB_2-TiB_2. F. W. Glaser and W. Ivanick. *Powder Metallurgy Bulletin,* v. 6, Feb. 1953, p. 126-132.

Rate of reaction for solid solution formation at various temperatures. Graphs. (H11, Ti, Zr, B)

28-H. Density Determination of Porous Metal Parts. Walter M. Schwarzkopf. *Powder Metallurgy Bulletin,* v 6, Feb. 1953, p. 134-135.

Technique for routine control method using silicone oils. (H11)

29-H. Bimetallic Metal-Powder Parts. V. V. Saklinskii. Henry Brutcher Translation 2968. 8 pages. (From *Vestnik Mashinostroeniia,* v. 32, no. 3, 1952, p. 76-79.)

Reports on two production processes recently developed by Orgavtoprom Institute for bimetallic parts. Particulars on production steps for thin-walled bearing inserts, lead-bronze powder layer on steel base, from preparation of powder mix to finishing operation.
(H general, Cu, ST)

30-H. Recrystallization of Wrought Hydrogen-Sintered Molybdenum and Its Alloys. M. H. LaChance, W. L. Bruckart, C. M. Craighead, and R. I. Jaffee. *Transactions of the American Society for Metals,* v. 45, 1953; p. 314-332.

Recrystallization characteristics of H_2-sintered Mo from four commercial powders are compared. Effects of 12 alloying elements were investigated. (H11, N5, Mo)

31-H. (German.) The Special Position of Powder Metallurgy in Making Permanent Magnets. W. Hotop. *Metall,* v. 7, Jan. 1953, p. 1-9.

Sintering of Al-Ni-Co alloys with fine-grained stable structure having good mechanical properties. Graphs, diagrams, and photographs.
(H general, SG-n)

32-H. Metal Powder Filters. A. J. Langhammer and Phillip Glick. *Product Engineering,* v. 24, Apr. 1953, p. 179-182.

Details of bronze filters produced by powder metallurgy process to be used for diffusing, separating, metering fluids, flame proofing, or sound deadening. Graphs and photographs. (H general, T8, Cu)

33-H. (German.) Notice on the Preparation of Intimately Mixed Iron and Copper Powders. A Report on the Chemistry of Mixtures. G. F. Hüttig and A. Vidmajer. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 272, no. 1-4, 1953, p. 40-44.

Experimental research in which Fe and Cu were precipitated as oxalates and reduced to metallic mixture. (H12, Fe, Cu)

34-H. (Book.) The Measurement of Particle Size in Very Fine Powders. H. E. Rose. 127 pages. Constable & Co., Ltd., 10 Orange St., London, W.C.2, England. 9s. net.

An introduction to particle size measurements. Defines size frequency, specific surface, and particle shape. Errors in size frequency due to deviations from streamline conditions. Theory of photo-extinction method and its application to nonspherical particles and water analysis. Determination by N_2 adsorption, tinting strength methods, and bulk density tests. (H11)

35-H. How to Make Carbide Cold-Heading Dies. A. Earle Glen. *American Machinist,* v. 97, Apr. 27, 1953, p. 138-140.

Shows that fewer machine stops for die changes, lower die cost per piece, and maintenance of closer dimensional tolerances generally result when cemented-carbide nibs and hammers replace steel die parts in upsetters. Diagrams.
(H general, G10, W, TS)

36-H. Tungsten-Carbide Shell Cores. Edgar Altholz. *Machinery* (American), v. 59, Apr. 1953, p. 159-164.

Development and production of WC shell cores which penetrate heavy armor tanks. Photographs.
(H general, T2, W, C-n)

37-H. (German.) **Preparation of Pulverized Ag-Hg Alloys at Room Temperature.** F. Hund and J. Müller. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 27, no. 2, p. 131-138.

Preparation of the alloys. Lattice constants, densities, lattice disturbances, and primary particle sizes were determined. Tables and graphs. 15 ref.
(H16, M26, Ag, Hg)

38-H. Factors Controlling the Combustion of Zirconium Powders. Holger C. Andersen and Lawrence H. Belz. *Electrochemical Society, Journal,* v. 100, May 1953, p. 240-249.

Activity of Zr metal powders was studied by measurements of ignition temperature, burning time, and ignition energy on subsieve powders prepared by Ca reduction of ZrO_2 and on coarse powders made by grinding fused Zr. Tables and graphs. 30 ref. (H11, Zr)

39-H. The Hard Carbides. Their Properties and Application to the Production of Sintered Hard Metal. A. G. Gardner. *Metallurgia,* v. 47, Apr. 1953, p. 163-170.

Manufacturing processes and control necessary to insure a consistently satisfactory product. Cemented carbides used for cutting tools. Graphs, micrographs.
(H general, C-n, SG-j)

40-H. Sorption of Gases at Very Low Pressures by Thorium Powder. S. Wagener. *Physical Society, Proceedings,* v. 66, sec. B, May 1953, p. 400-413.

Sorption rate of Th powder for O_2 and H_2 is measured at pressures between 10^{-7} and 10^{-3}mm Hg as a function of temperature of the Th and of the period of exposure to gas. Graphs. (H11, Th)

41-H. (French.) **Heat Resistant Materials. Progress in Fabrication of Tungsten and Molybdenum.** R. Locquin. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 12-18.

Use of pure W and Mo, in massive form and as powder, because of their excellent qualities which depend on both chemical purity and suitable structure.
(H general, T general, W, Mo)

42-H. (German.) **Use of Sulfur-Impregnated Sintered Powdered Iron as a Bearing Material.** Gerd Maassen. *Stahl und Eisen,* v. 73, no. 4, Feb. 12, 1953, p. 219-222.

Wearing effect upon steel. Compares sliding properties with those of other grades of powdered iron.
(H11, T7, Q9, Fe)

43-H. (German.) **New Method for Reducing Fe Powders.** Heinrich Siepmann. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 360-364.

Turbulence reduction method. Plant design, operation, and test results. (H10, Fe)

44-H. (German.) **Synthetic Solids. XI. The Effect of Surface Layers, Especially Oxide Layers, on the Sintering of Metals.** M. Clasing and F. Sauerwald. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 88-92.

Thin oxide layers on Cu and Fe powders facilitated sintering if the upper layers of the particles were loosened and made more subject to reacting. (H15, Cu, Fe)

45-H. (German.) **Sintering and the Activity of Solids.** J. A. Hedvall. *Berichte der Deutschen Keramischen Gesellschaft e. V.,* v. 30, no. 1, Jan. 1953, p. 8-13.

Sintering without melting, recrystallization process, surface change, lattice structure, diffusion, and activity state. (H14, H15)

46-H. Powder Metallurgy. A. E. Williams. *Mining Journal* (London), Annual Review, May 1953, p. 109-111.

Developments in powders (stainless steel, Ni-Cu) and techniques.
(H general, Ni, Cu, SS)

47-H. Molds for Rubber by Powder Metallurgy. *Precision Metal Molding,* v. 10, Sept. 1952, p. 31.

Alloy steel molds for rubber erasers. (H general, T29, AY)

48-H. Bearing Plates for Gear Train Redesigned From Forgings to Sinterings. *Precision Metal Molding,* v. 10, Nov. 1952, p. 27, 67-68.

Advantages of using powder metallurgy techniques. (H general, Fe)

49-H. "Pinpoint" Lubrication by Powder Metallurgy. Charles Fillinger. *Precision Metal Molding,* v. 11, Jan. 1953, p. 26-27, 86.

Applications. (H13)

50-H. Impregnation as a Method of Preparing Sinterings for Plating. Wilson N. Pratt. *Precision Metal Molding,* v. 11, Jan. 1953, p. 47-49.

Method for overcoming porosity so that parts can be satisfactorily plated. (H16, H15)

51-H. How Service Conditions and Costs Affect Design of Sintered Cams. G. L. Bachner. *Precision Metal Molding,* v. 11, Feb. 1953, p. 32-34.

Costs, service conditions, shapes, accuracy, and quantities. Photographs. (H general)

52-H. How Large a Part by Powder Metallurgy? A. J. Langhammer. *Precision Metal Molding,* v. 11, Mar. 1953, p. 34-35, 80-81.

Factors to be considered when designing powder metallurgy parts. Photographs. (H general)

53-H. Brass Sinterings Replace Extrusions and Machined Parts. P. R. Kalischer. *Precision Metal Molding,* v. 11, Apr. 1953, p. 34-35, 127.

Typical applications of brass sinterings in plumbers' goods. (H general, T6, Cu)

54-H. Chromium-Nickel Alloy Steel Sinterings. An Investigation of Physical Properties. J. D. Shaw, W. V. Knopp, and B. A. Gruber. *Precision Metal Molding,* v. 11, Mar. 1953, p. 42-45, 73-76.

Initial research phase in determining position of Cr-Ni alloys in powder metallurgy and their applicability in combination with Fe and graphite powders to produce alloy steel compositions. Tables. (H general, Cr, Ni, Fe)

55-H. Tolerance Control of Sinterings for Cost Control. Richard B. Thomson. *Precision Metal Molding,* v. 11, Apr. 1953, p. 38-40, 123-124.

Factors affecting tolerance control, tolerance figures for basic operations, control with the coining operation added, and problems of concentricity and center distance. (H14)

56-H. Now It Can Be Told How Powder Metallurgy Produces Solid Tungsten-Carbide Anti-Tank Shell Cores. *Precision Metal Molding,* v. 11, May 1953, p. 42-44.

Describes and illustrates process. (H general, T2, W, C-n)

57-H. Tiny Sintered Pinions. A Comparison With Extruded Brass. Robert J. Visin. *Precision Metal Molding,* v. 11, May 1953, p. 45-46, 75-76.

Description. (H general, G5, Cu)

58-H. Hydrometallurgical Process Yields Pure Metal Powders From Sulphides. *Journal of Metals,* v. 5, June 1953, p. 775-779.

Ammonia leach-hydrogen reduction process for Ni-Co concentrate. Tables. (H10, Ni, Cu, Co)

59-H. (German.) **Mechanical Production of Metallic Powders.** H. Kramer. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 262-268.

Aspects of production and operational possibilities of the vortex hammer mill. 7 ref. (H10)

60-H. Some Considerations Governing the Design and Production of Powdered Metal Components. H. M. Greenwood. *Machinery* (London), v. 82, May 29, 1953, p. 1003-1008.

Materials which may be used; porosity and impregnation; specification of physical properties, composition and accuracy; design considerations; and production trends. (H general)

61-H. (German.) **Dielectric Research on Powders.** R. Mecke and H. Schill. *Zeitschrift für Elektrochemie; Berichte der Bunsenegsellschaft für physikalische Chemie,* v. 57, no. 4, 1953, p. 270-276.

Indirect experimental and mathematical method of establishing accurately the dielectric constants of powder precipitates in liquids, density of the sediment, and such surface conditions as adsorption, moisture content, etc. Diagram, tables, graphs. 21 ref. (H11)

62-H. Iron Powder Magnets. *Engineer,* v. 195, May 22, 1953, p. 740-741.

New kind of permanent magnet made from soft ferromagnetic powders. Characteristics of micropowder magnets in comparison with other commercially available magnetic materials. (H11, Fe, SG-n)

63-H. Sintered Steel Bushings Extend Life of Roller Chain. L. H. Whitney and R. Talmage. *Iron Age,* v. 171, June 25, 1953, p. 125-127.

Roller chain with sintered steel bushings is suitable for use where standard roller chain is not or cannot be lubricated properly. (H general, T7, AY)

64-H. An Investigation of Boron Carbide. Frank W. Glaser, David Moskowitz, and Benjamin Post. *Journal of Applied Physics,* v. 24, June 1953, p. 731-733.

Experiments and results of preparing and characterizing boron carbide. Graphs. 12 ref. (H10)

65-H. Phase Diagrams Play an Important Role in Powder Metallurgy. Robert Steinitz. *Journal of Metals,* v. 5, July 1953, p. 891-894.

Use of phase diagrams to tell when two or more materials reach an equilibrium in powder metallurgy. Diagrams. 6 ref. (H general, M24)

66-H. Control in Powder Metallurgy. H. W. Greenwood. *Metal Industry,* v. 82, June 5, 1953, p. 461-462.
Examples of control to indicate their simple but valuable nature. (H general)

67-H. Use Self-Lubricated Sinterings Where You Can't Lubricate. *Precision Metal Molding,* v. 11, July 1953, p. 30-31, 68.
Detailed report of two sintered cams which are subjected to extremely severe operating conditions. Diagrams. (H16)

68-H. No Back Pressure Problem When You Filter With a Bronze Sintering. Robert Caplan. *Precision Metal Molding,* v. 11, July 1953, p. 43, 68-69.
Advantages of sintered bronze filters for refrigerants. (H general, Cu)

69-H. The Effect of Infiltration on Physical Properties of Sinterings. George Stern. *Precision Metal Molding,* v. 11, June 1953, p. 92-102.
Field of iron and steel compacts infiltrated with Cu base alloys. Theory, practice, and economic factors. Variables affecting infiltration, such as composition of the skeleton and infiltrant; effect of the time and temperature; and effects of subsequent heat treatments. Micrographs, tables. (H16, Fe, ST, Cu)

70-H. Carbide With a Twist. *Steel,* v. 132, June 29, 1953, p. 92.
Swift, precise method of twisting and bending carbide to fit helical tool bodies. Photographs. (H14, C)

71-H. (German.) **Influence of Reduction Temperature of Nickel and Cobalt Compounds on Catalytic Properties of Metallic Catalysts.** F. Lihl and P. Zemsch. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für physikalische Chemie,* v. 56, no. 10, 1952, p. 979-985.
Ni and Co powders were prepared by reduction of various compounds. Activity of Ni as catalyst was very sensitive to reduction temperature. Graphs, tables. (H10, Ni, Co)

72-H. Cemented Carbide Tips and Tools. *Iron and Steel,* v. 26, p. 365-368.
Layout, manufacturing procedure, control and production. Diagrams, photographs. (H general, C-n)

73-H. High Strength Precision Iron Powder Parts. William J. Doelker and Harold T. Harrison. *Materials & Methods,* v. 38, July 1953, p. 67-71.
Shows they have excellent surface finish, are successfully produced at high production rates, reduce production and tool costs, and have low scrap loss. Graphs, photographs. (H general, Fe)

74-H. Impregnation of Powder Metallurgy Parts Improves Corrosion Resistance. Wilson N. Pratt. *Steel,* v. 133, July 13, 1953, p. 122-123.
Impregnating powder parts with polyester-type resin, prior to plating. Photographs. (H16, R general)

75-H. (Italian.) **On the Effects of Copper and Solid Lubricants on the Dimensional Variations During Sintering of Pure Iron Pieces.** Carlo Ghiglieno. *Metallurgia Italiana,* v. 45, no. 4, Apr. 1953, p. 128-132.
Work carried out to study the behavior of sintered parts due to the heating cycle. Components of the mixtures, compression pressure, sintering time, and temperature. Diagrams. Graphs. 3 ref. (H15, H13, Cu, Fe)

76-H. (Russian.) **Granulation of Powders by the Rolling Method.** S. S. Voiutskii and S. I. Rubina. *Legkaia Promyshlennost,* v. 12, no. 10, Oct. 1952, p. 36-39.
Carbon black was rolled in drums to form granules. No bonding agent was necessary. Advantages of this process. Tables, graph, micrograph, drawing. (H10)

77-H. Magnetization Curves of Powdered Iron. A. D. Franklin. *Franklin Institute, Journal,* v. 256, July 1953, p. 90-92.
Study on the way in which the intensity of magnetization approaches saturation in high fields for this type material. Graph. (H11, Fe)

78-H. New Process Gives Unusual Powder Parts. H. J. Hamjian and F. N. Darmara. *Iron Age,* v. 172, July 30, 1953, p. 98-100.
Use of C, Ti, and Zr to form complex parts. Photographs. (H general, C, Ti, Zr)

79-H. An Understanding of Cemented Tungsten Carbides and Their Applications in Mining. A. F. Dobbrodt. *Mines Magazine,* v. 43, July 1953, p. 13-14, 30.
Photographs. (H general, T28)

80-H. New Magnetic Materials of High Coercivity. L. F. Bates. *Nature,* v. 172, July 18, 1953, p. 97.
Production and properties of permanent magnets. 4 ref. (H general, P16, Fe, Ni, Co, Al, Cu, Ag, SG-n)

81-H. Longer Service Life Obtained From Powdered Metal Parts. *Precision Metal Molding,* v. 11, Aug. 1953, p. 27, 68.
Properties and characteristics of powdered metal parts. (H general)

82-H. High Frequency Cores. An Important Use for Powdered Iron. Richard D. Ponemon. *Precision Met-*

al Molding, v. 11, Aug. 1953, p. 30-32, 74-80.

Production of the cores. Photographs. (H general, P15, Fe, SG-q)

83-H. (French.) **The Manufacture of Self-Lubricating Bearings. Sintering in the Presence of a Liquid Phase.** P. Laurent and M. Eudier. *Revue de Metallurgie,* v. 50, no. 6, June 1953, p. 382-388.

Difficulties arising from the presence of a liquid phase during passage through a furnace. Graphs, photographs. 9 ref. (H15, Cu, Fe)

84-H. (English.) **Some Observations on the Mechanism of Liquid Phase Sintering.** H. S. Cannon and F. V. Lenel. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 106-121; disc., p.121-122.

Provides better understanding of the mechanism of the sintering process. Explains rate of densification and the manner in which variables affect this rate. Micrographs, graphs. (H15)

85-H. (English.) **The Development of High-Strength, Heat Treatable Products From Alloy Powders.** G. J. Comstock and F. H. Clark. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 123-139.

Powder metallurgy process and materials which can be produced. Considers Fe, brass, Al, Cu, and nickel silver. Graphs, diagrams, micrographs, tables.
(H general, Fe, Cu, Al, Ni, Zn)

86-H. (English.) **The Effect of Lattice Changes on the Sintering Process.** H. H. Hausner. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 146-155; disc., p. 155-156.

Initial phases of the H_2 reduction of oxide films and effect of Zr hydride decomposition during sintering. Tables, micrographs.
(H15, M26, Zr)

87-H. (English.) **The Production of Metal Powders by Fusion Electrolysis.** W. J. Kroll. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 160-170.

Problems of cell construction and the electrolyte; soluble and insoluble anodes; and continuous or semicontinuous electrolysis. Ti, W, Mo, and Mn are used as examples. Diagrams. (H10, Ti, W, Mo, Mn)

88-H. (English.) **Powder Metallurgy as Viewed by a Manufacturer of Metal Powder Products.** A. J. Langhammer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 171-174.

Advantages of powder metallurgy.
(H general)

89-H. (German.) **Influencing the Sintering Properties of Metallic Powders by Surface Treatment.** Gerhard Naeser and Hans Burmeister. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 251-255.

Possible improvement of parts by the process. Graphs, tables. 21 ref. (H15)

90-H. (German.) **Contemporary Views on the Nature of Metals and Its Importance for Metal Ceramics (Powder Metallurgy).** F. Skaupy. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 81-87; disc., p. 88.

Nature of metals with special attention to interatomic distances and properties of thin layers. Concepts are applied to some problems of powder metallurgy. Graphs.
(H general, M25)

91-H. (German.) **Determination of Metal-Powder Adhesion.** E. Cremer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 140-145; disc., p. 145.

Measurement of the glide angle of a powder dusted on a solid support permits the determination of "adhesive force". Value depends on surface properties of both powder and support and is inversely proportional to the particle diameter of the powder. Graphs, tables.
(H11)

92-H. (German.) **Micro-Hardness as an Expedient for Tests of Sinter-Processes in Complex Systems.** E. M. Onitsch-Modl. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 175-184; disc., p. 184-187.

Alloying process incurred during the sintering of Fe-C alloys which contain the carbide-forming elements Cr, W, Mo, and V observed by means of the micro-hardness test. Applications and limits of test. Micrographs, graphs. 11 ref.
(H15, Q29, Fe, Cr, W, Mo, V)

93-H. (German.) **A Contribution to the Physical Analysis of the Sintering Process.** G. Ritzau. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 188-198.

Principles of the method for binary systems which exhibit either complete mutual solubility (Cu-Ni) or complete mutual insolubility (Cu-Fe) in the solid as well as liquid states. Poor sintering performance of Ni is indicated by this analysis. For sintered hard metals and magnets it is shown that the method is capable of recording the course of sintering in complex alloys. Graphs, micrographs. (H15, Cu, Ni, Fe)

94-H. (German.) **The Surface Layers, Particularly Oxide, and Their Influence on Sintering.** F. Sauerwald. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 199-202.

Factors responsible for the stability of oxide films on Cu. Effect of stable and unstable oxide films on the mechanical strength of sintered Cu compacts. Graphs. (H15, Q23, Cu)

95-H. (German.) **The Application of Tracer Method in Powder Metallurgy.** H. Schreiner. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 203-209; disc., p. 210.

Various means whereby specimens like metal powder, press and sinter compacts may be made radioactive. It is possible to obtain kinetics of sintering at a constant temperature of sintering. Sinter curves of pure metals, e.g. Fe and Cu. Graphs. (H15, S19, Fe, Cu)

96-H. (German.) **New Development in Aluminum Powder Metallurgy.** A. von Zeerleder. Paper from "Plansee Proceedings 1952." Metallwerk Plansee Ges. M. B. H., p. 211-219; disc., p. 219-220.

SAP process for producing Al powder. Micrographs, tables, graphs. (H10, Al)

97-H. (German.) **Production of Pure Titanium Carbide.** G. F. Hüttig. Paper from "Plansee Proceedings 1952". Metallwerk Plansee Ges. M. B. H., p. 259-267; disc., p. 267.

Shows that chemical composition should correspond to the chemical formula, free-carbon content should be as low as possible, and particle size distribution should be within certain limits. Tables. (H10, Ti, C)

98-H. (Hungarian.) **Sintered Copper-Aluminum Connectors.** Endre Bohner and Jozsef Lukacs. *Electrotechnika,* v. 46, no. 3, Mar. 1953, p. 81-86.

Manufacture, control tests and use to connect Al and Cu wires. Diagrams, micrographs. (H general, T1, Cu, Al)

99-H. (Russian.) **An Experiment on the Application of Steel Powder From Grinding Waste.** V. I. Melnik. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 17-19.

Mechanical and demagnetizing treatment of powders. Use for electrode coatings. (H general, ST)

100-H. (Russian.) **Determination of the True Specific Surface of Hard Dispersoids by Air Permeability.** T. A. Zavaritskaia and V. N. Grigarov. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 757-758.

Data on Al and polystyrol powders. Tables. 3 ref. (H11, Al)

101-H. Powder Metallurgy. E. E. Rooste. *Australasian Engineer,* June 8, 1953, p. 62-69, 121.

Principal applications of powder metallurgy to the manufacture of W lamp filaments, Mo wires, processing Ta and Cb, production of electric motor brushes, porous bearing, sintered "Alnico", electrical contact alloys, and the manufacture of WC products. Photographs, photomicrographs. 33 ref. (H general, T general)

102-H. Sintered Titanium Carbides Open New Industrial Horizons. John W. Graham. *Iron Age,* v. 172, Aug. 13, 1953, p. 148-152.

Uses and advantages of Ti carbides sintered with Ni, Co and Fe-base alloys. Photographs, graphs. (H15, T general, Ti, Ni, Co, Fe)

103-H. Reducing Costs by the Application of Powder Metallurgy. *Machinery (London),* v. 83, July 31, 1953, p. 213-214.

Successful application of the process. Photographs. (H general)

104-H. Granular Powders for Powder-Metallurgical Applications. *Materials & Methods,* v. 38, Aug. 1953, p. 127, 129, 131.

Tabulated information. (H10)

105-H. Cemented Chrome Carbides. J. D. Kennedy. *Product Engineering,* v. 24, Aug. 1953, p. 154-157.

Physical and mechanical properties, finishing and joining techniques and suggested uses. (H general, Cr)

106-H. (Book.) **Plansee Proceedings 1952.** F. Benesovsky, editor. 316 p. 1953. Metallwerk Plansee G.m.b.H., Reutte/Tyrol.

Contains 29 papers presented at the First Plansee Seminar "De Re Metallica" held June 22-26, 1952, in Reutte/Tyrol. Papers are abstracted separately. (H general, Q general)

107-H. The Borolites. High Temperature Materials by Powder Metallurgy. Paul Schwarzkopf. *Research Reviews,* Aug. 1953, p. 25-30.

Characteristics of cemented borides for use at high temperatures. Photographs. (H general)

108-H. Powdered Aluminium. R. H. Warring. *Mechanical World and Engineering Record,* v. 133, Aug. 1953, p. 350-352.

Methods used in manufacture. Diagrams. (H10, Al)

109-H. Measurement of Particle Size of Fine Ferromagnetic Powders. A. D. Franklin, R. Campbell, and J. Weinman. *Journal of Applied*

Physics, v. 24, Aug. 1953, p. 1040-1045.

Particle sizes of four Fe and two Fe-Co powders with diameters from 200 to 600 Å. were determined using electron microscope, X-ray line broadening, and nitrogen adsorption techniques. Method of dispersing single-domain ferromagnetic powders for electron microscopy. Tables, graphs, micrographs. (H11, M21, Fe, Co)

110-H. Report of Committee B-9 on Metal Powders and Metal Powder Products. F. V. Lenel, chairman, American Society for Testing Materials, Preprint no. 15, 1953, 6 p.

Specifications covering sintered powder gears, cams, levers, lock hardware and other structural parts. Tables. (H general, S22, Cu)

111-H. Subsieve Particle-Size Measurement of Metal Powders by Air Elutriation. Rolla E. Pollard. *Journal of Research, National Bureau of Standards,* v. 51, July 1953, p. 17-31.

Measurements of spherical metal powders by means of the "Roller" air analyzer, using samples up to 40 g. of powder. Diagram, graphs, micrographs, tables. 15 ref. (H11)

112-H. Magnesium Powder Is Becoming Big Business. *Magnesium,* Aug. 1953, p. 12-16.

Safety precautions, production and research in a Mg powder plant. Photographs. (H general)

113-H. Manufacture of Cemented Carbides. Carl Ballhausen. *Metal Progress,* v. 64, Aug. 1953, p. 166, 168, 170, 172, 174, 178, 180.

Digest of "Changes in the Techniques of Manufacturing Cemented Carbide Alloys," *Stahl und Eisen.* See item 5-H, 1952. (H12, H14, H15, C-n)

114-H. Survey of Developments in Hard Metals. E. J. Sanford. *Metal Progress,* v. 64, Sept. 1953, p. 132, 134, 138.

Condensed from "Recent Developments in Hard Metals", *Alloy Metals Review,* v. 8, Mar. 1953. (H general)

115-H. Recent Developments and Trends in Powder Metallurgy. H. W. Greenwood. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 427-429, 431.

Progress and trends in production and applications. Table. 7 ref. (H general, SS, Ni, C-n, Al, Fe, Mg)

116-H. Review & Progress Report. Aluminum Powder Metallurgy. J. B. Haertlein and J. F. Sachse. *Modern Metals,* v. 9, Sept. 1953, p. 54-55, 58, 60-61.

Production and applications of Al powder and powder products. Photographs, tables, graphs. (H general, T general, Al)

117-H. (French.) **Sintering of Zirconium Carbide by Hot Pressing. Some Preliminary Results of Resistance of Carbides to Oxidation.** W. Watt, G. H. Cockett, and A. R. Hall. *Metaux Corrosion-Industries,* v. 28, no. 333, May 1953, p. 222-237.

Zr, Ti, V, Ta carbides oxidized readily at 8000° C. in dry air. Cr_3C_2 resisted oxidation up to 1000° C. Diagrams, graphs, photographs, microphotographs, tables. 28 ref. (H15, Zr, Ti, V, Ta, Cr)

118-H. (German.) **Flow Properties of Silver Powder.** Albert Keil. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 292-294.

Heat treatment to minimize tendency to form agglomerates. Photographs. 6 ref. (H11, Ag)

119-H. (Portuguese.) **Some Experimental Data on the Production of Hard Sintered Carbides.** Vicente Chiaverini. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 5-20.

Experimental production of sintered W, Ti and Ta carbides. Properties, details of the sintering process and effects of various factors upon their hardness. Tables. (H15, H11, W, Ti, Ta)

120-H. (Book.) **Metal Powder Association, Proceedings.** (Annual Volume.) 111 p. 1953. Metal Powder Association, 420 Lexington Ave., New York 17, N. Y. $2.50.

Use of metal powders and powder metallurgy in electronics, the production of precision high density parts, applications such as friction materials for automatic transmissions, alloy powders, non-metallic impregnation, and the powder metallurgy of aluminum. (H general, Al)

121-H. The Toy Industry. Why it Uses Powdered Metal Parts by the Million. *Precision Metal Molding,* v. 11, Oct. 1953, p. 46-48, 120.

Applications of powder metallurgy in manufacturing low-cost parts. Photographs, table. (H general)

122-H. Are High Density Parts Practical by Powder Metallurgy? *Precision Metal Molding,* v. 11, Oct. 1953, p. 50-51.

Three examples of high-density parts being made by powder metallurgy at lower costs than when made by other fabricating processes. Photographs. (H general, Fe)

123-H. The Sintering Process. I. Theory. Philip R. Kalischer. *Preci-*

sion Metal Molding, v. 11, Oct. 1953, p. 58-59, 109-115.

Possible mechanisms involved. (To be continued.) Diagrams. (H15)

124-H. (German.) **Production of Alloys by Impregnation.** Heinz Anders. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 308-309.

Progress in powder metallurgy in Germany and abroad. 3 ref. (H16, Cu, Zn, Ag)

125-H. (Hungarian.) **Development of Aluminum Powder Metallurgy.** György Halmos. *Aluminium, (Budapest),* v. 5, no. 6, June 1953, p. 130-133; no. 7, July, 1953, p. 159-162.

Experiments with Al alloy, Al-Cu bimetallic, Al-metalloid and Al sintered bodies. Machinery used and strength values achieved. Tables, charts, diagrams, photographs. (To be continued.) (H general, Al)

126-H. Effective Thermal Conductivities of Magnesium Oxide, Stainless Steel, and Uranium Oxide Powders in Various Gases. C. S. Eian and R. G. Deissler. *U. S. National Advisory Committee for Aeronautics, Research Memorandum* E53G03, Oct. 29, 1953, 18 p.

Tests were conducted at temperatures between 120 and 1455° F. Fair agreement was obtained between conductivities calculated from experimental data and those calculated from a simplified analysis. Effect of gas pressure on effective thermal conductivity. Graphs, micrographs. (H11, P11, SS)

SECTION J

HEAT TREATMENT

1-J. Automatic Heat-Treating Speeds Gear and Pinion Production. Herbert Chase. *Iron Age,* v. 170, Nov. 20, 1952, p. 128-130.

Installation of new heating and quenching equipment which virtually eliminates the need for slow and expensive pinion straightening operations. Except for loading and unloading, the new setup is fully automatic. Handling was reduced considerably, production increased sharply, and quality improved. (J26, ST)

2-J. Fast Gas Furnace Anneals at Normalizing Temperatures. C. A. Turner, Jr. and S. L. Yarborough. *Iron Age,* v. 170, Nov. 20, 1952, p. 140-142, 144.

Shortened annealing time achieved by above furnace for mortar shells. (J23, CN)

3-J. Heating Steel in a Specialty Mill. Laurance F. Van Mater. *Iron and Steel Engineer,* v. 29, Nov. 1952, p. 74-76; disc., p. 76.

General heating procedures in a specialty mill of relatively small tonnage and rather widely diversified products, including items made of high and low-expansion alloys, permanent magnet steels, corrosion- and heat-resistant alloys, valve steels, high-C, high-Cr and high speed steels, and special purpose toolsteels grouped according to type of heating involved in chronological order through various stages of hot working and including subsequent heat treatment. (J general, F1, CN, TS, SG-h, g, n, s)

4-J. What's Ahead the Next Ten Years in Heat-Treating. *American Machinist,* v. 96, Mid-Nov. 1952, p. G-G3.

Carbon restoration, atmosphere generators, furnaces as machines, metallurgical control, furnace fixtures, salt-bath operations, flame hardening, and induction heating. (J general)

5-J. Gas Heat Becomes Precision Tool in End-Hardening Rails. *Industrial Gas,* v. 31, Nov. 1952, p. 8-9.

Use of radiant burners for end-hardening rails. (J26, CN)

6-J. Induction Hardening of Gear Teeth. *Machinery* (London) v. 81, Nov. 14, 1952, p. 1038-1040.

Developments in high-frequency induction heating which offer new and attractive possibilities for gear heat treatment including cost savings and higher production rates. (J2, ST)

7-J. Induction Hardening Boron Steel Gears. George Van Camp. *Materials & Methods,* v. 36, Nov. 1952, p. 121-122.

Changing from a low-alloy to a plain-carbon boron steel and from a two-piece assembly to a solid forging also required changes in hardening technique to assure high surface hardness over a tough core. (J2, AY)

8-J. Gas-Liquid Carburizing. Victor Kappel. *Metal Progress,* v. 62, Nov. 1952, p. 108.

Results of carburizing under positive gas pressure to prevent "subsurface" oxidation and slight scaling during cooling. (J28, ST)

9-J. Automatic Heat Treating Line With Duplex Quench—Either Oil or Water. Fred C. Schaefer and Richard L. Burdsall. *Metal Progress,* v. 62, Nov. 1952, p. 113-116.

Batch loader, continuous heat treating machine, automatic quench tanks, and washing machine installed at Port Chester plant of Russell, Burdsall & Ward Bolt and Nut Co. which makes a large variety of steel screws, bolts and fasteners. Emphasizes ability of equipment to change promptly from oil quenching and washing one type of bolt to water quenching another type, and its economy in comparison with batch treatment in salt pots. (J26, ST)

10-J. Heat-Treatment Oils. Uses in the Metallurgical Industry. A. L. H. Perry. *Metal Treatment and Drop Forging,* v. 19, Nov. 1952, p. 467-473, 482.

Types of oils used in heat treating, their origin, application, mode of action, and testing. Tables and photographs. (J2)

11-J. Compressed Air As Cooling Medium in Patenting Steel Wire. Part 2. B. M. Pearson. *Wire Industry,* v. 19, Nov. 1952, p. 1027-1028. (Based on article by W. Puengel, *Stahl und Eisen,* v. 69, no. 8, p. 262-265.)

Some interesting new techniques in steel-wire patenting, employing compressed air as cooling medium. Results of mechanical tests are tabulated and charted. (J25, Q general, ST)

12-J. (Swedish.) **Reaction Equilibria in Protective Gas Annealing. I. Development of Protective Gas Annealing and Importance of Gas Equilibrium to Properties of Protective Gases.** Torkel Berglund. **II. Computation of Gas Reaction Equilibriums in Protective Gas Reactions.** Torkel Berglund, Stig-Erik Erikson, Bertil Lindeskog, and Rolf Marstrander. *Jernkontorets Annaler,* v. 136, no. 8, 1952, p. 253-313; disc., p. 313-316.

Importance of above in annealing of ferrous metals and various types of gas mixtures. Diagrams are given for all reactions. Tables and charts. 25 ref. (J23, Fe)

13-J. Flame-Hardening for the Small Shop. *Linde Tips and Oxy-Acetylene Tips,* v. 32, Jan. 1953, p. 11.

A handy flame-hardening outfit for small shops. (J2, ST)

14-J. Induction Heating Speeds Up Production of Bolt Manufacturing. Howard E. Jackson. *Machine and Tool Blue Book,* v. 48, Dec. 1952, p. 147-153.

How induction heating has increased production and quality for the Northwest Bolt and Nut Co., Seattle, Wash. (J2, G10, ST)

15-J. Die Quenching Aluminum Alloys. John Starr. *Machine and Tool Blue Book,* v. 48, Dec. 1952, p. 201-204, 206.

Special equipment and process developed by North American Aviation, Inc., Los Angeles, for heat treating a single-component wing structure previously assembled from 226 pieces of 75S-T Al alloy. (J26, Al)

16-J. An Investigation of the Effect of Heat Treatment Upon the Hardness, Microstructure and Combined Carbon Content of Some Nodular Cast Irons. James H. Barnett. *Quarterly of the Colorado School of Mines,* v. 47, Jan. 1952, p. 45-87.

Investigation to determine effect of soaking time and quenching temperature on microstructure, combined carbon content and hardness of several nodular cast irons, and to determine whether nodular cast irons produced by different nodulizing compounds behave in the same manner upon being quenched from the same temperatures. Tables, graphs, and micrographs. 13 ref. (J26, M27, Q29, CI)

17-J. Flame Hardening of Bed Ways Having Nonuniform Sections. *Tool Engineer,* v. 29, Dec. 1952, p. 47.

Machine developed by the Monarch Machine Tool Co. (J2, T5, ST)

18-J. Pit Type Carburizing Furnaces Provides Flexible Setup. W. J. Wright. *Automotive Industries,* v. 107, December 15, 1952, p. 46-47, 80, 82, 87-88.

Furnaces installed at Caterpillar Tractor Co. Photographs and diagram. (J28)

19-J. (Russian.) **The Softenability of Limited Solid Solutions of Metals.** K. A. Osipov and S. G. Fedotov. *Doklady Akademii Nauk SSSR,* v. 85, Aug. 11, 1952, p. 1081-1084.

Short-time (30 sec.) and long-time (60 min.) hardness tests of Cu-Al, Cu-Zn, and Cu-Sn alloys were made at 20 and 500° C. to study effects of electron concentrations on softenabilities of alloys. Data are charted. 17 ref. (J23, Cu, Al, Zn, Sn)

20-J. Short Cycle Annealing of Whiteheart Malleable Castings. P. F. Hancock. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 376-390.

Recent British developments in short-cycle annealing of whiteheart malleable iron castings using controlled atmosphere furnaces. Micrographs and tables. (J23, CI)

21-J. Continuous Heating, Press Forging and Heat Treating of Automobile Crankshafts. II. *Industrial Heating,* v. 19, Dec. 1952, p. 2246-2248, 2250, 2252, 2254, 2256, 2258.

Automatic operations of hardening, tempering, and shot-blast cleaning. Photographs and diagrams. (J26, J29, L10, CN)

22-J. Hints on the Heat Treatment of Tool Steels. L. H. Seabright. *Iron Age,* v. 171, Jan. 1, 1953, p. 310-311.

General discussion. (J general, TS)

23-J. Heat Treating Aluminum Alloys. Tempering Oils for Aging 75S. Gilbert C. Close. *Light Metal Age,* v. 10, Dec. 1952, p. 8-9.

General discussion. (J27, Al)

24-J. Versatile Fixtures for High Production Gas Carburizing. T. A.

Frischman. *Materials & Methods,* v. 36, Dec. 1952, p. 109-111.

Methods of handling camshafts, gear shafts, bored pieces and other complicated parts of many different sizes by use of trays. (J28, ST)

25-J. Salt Bath Carburizing. John K. McIver. *Metal Progress,* v. 62, Dec. 1952, p. 85-87.

Advantages, economic factors, and various uses. Practical operations in diversified plant. (J28, J2)

26-J. A Cooperative Research Program on Quenching. Victor Paschkis. *Metal Progress,* v. 62, Dec. 1952, p. 93-96.

Background, purpose, and organization research on rates of temperature change at Columbia University. (J26, CN)

27-J. Jet Parts Call for Novel Heat-Treatment. *Metal-Working,* v. 9, Jan. 1953, p. 12-13.

Newly designed furnace employed for stress-relieving operations installed by Ryan Aeronautical Co. (J1)

28-J. Bed Ways: Hardened Under Fire. *Steel,* v. 131, Dec. 29, 1952, p. 86.

Design and construction of machine for flame hardening of lathe bed ways. Photographs. (J2, CI)

29-J. Case-Hardening of Austenitic Stainless Steels by the Carbidizing Process. Lloyd M. Allen and Dudley Woodard. *Steel Processing,* v. 38, Dec. 1952, p. 615-620.

Formation of Cr carbides and carbidization of Type 303 stainless. Micrographs. (J28, SS)

30-J. Gas Fired Furnaces Help Save Critical Material. Fred H. Bremmer and F. J. Zehnder. *Steel Processing,* v. 38, Dec. 1952, p. 621-623.

Process of continuous heat treating quench and draw line to give steel specified characteristics with savings of Mo and Mn. Applications in furnaces. Photographs. (J26, AY)

31-J. High-Speed Flame-Hardening. H. C. Phelps. *Welding Engineer,* v. 38, Jan. 1953, p. 42-43.

Process developed by International Plainfield Motor Co., Plainfield, N. J., for hardening camshafts used in Mack truck, fire, bus, and marine engines. (J2, ST)

32-J. Modern Heat Treating of Axle Components. R. F. Lutz. *Automotive Industries,* v. 108, Jan. 1, 1953, p. 48-49, 122, 124, 126, 128.

Procedure developed and used at Timken-Detroit Axle Co., Newark, Ohio. Photographs. (J general, CN)

33-J. Automatic Induction Hardening of Transmission Shifter Forks. Arthur A. Lyness, Jr. *Automotive Industries,* v. 108, Jan. 1, 1953, p. 90, 96, 98.

Steps for forging high-carbon steel shifter forks, and use of new hardening machine which improved quality of product. (J2, F22, CN)

34-J. Cost-Cutting Method of Hardening Small Parts. Claude C. Dierdorf. *Machinery* (American), v. 59, Jan. 1953, p. 158-160.

Different intricately shaped parts are martempered, carbo-nitrided, carburized, straight-hardened, or annealed in a batch-type, controlled-atmosphere furnace having an automatic quench tank. Lower cost steels can be used, and cleaning and straightening operations are reduced. Photographs. (J26, J28, ST)

35-J. The Application of Ratio Delay Principle to Heat Treating Operations. Chas. R. Weir. *Metal Treating,* v. 3, Nov.-Dec. 1952, p. 8-9.

Survey made at Commonwealth Industries, Detroit. Data are tabulated. (J general)

36-J. Heat Treatment of Magnetic Materials. R. E. Wolf. *Metal Treating,* v. 3, Nov.-Dec. 1952, p. 10.

Necessary equipment and processes. (J general, SG-p, n)

37-J. (French.) **Determination of Annealing Conditions for the Relaxation of Stresses in Refractory Steels.** Georges Vidal and André Loupoff. *Métaux Corrosion Industrie,* v. 27, Sept. 1952, p. 371-378.

Investigations show parameters of relaxation annealing depend upon chemical composition of the alloy, upon its previous thermal treatment, and geometric form. Diagrams, graphs, and tables. (J23, Q25, SS)

38-J. Ryan "Puts the Heat On" Unwanted Stresses. *Aviation Age,* v. 19, Jan. 1953, p. 70-75.

Installation of four furnaces at Ryan Aeronautical Co. of San Diego to stress-relieve Ryan afterburners, rocket motors, aft frames, and other jet components. (J1)

39-J. The Annealing of Steel. J. Lomas. *British Steelmaker,* v. 19, Jan. 1953, p. 30-33, 35.

Examination of principles and efficient practice. Temperature ranges, avoidance of surface oxidation, improved ductility, cooling outside the furnace, case hardening steels, and salt bath annealing. (J23, ST)

40-J. How Ohio Heat Treating Co. Hardens Tools in Controlled Gas Atmospheres. C. W. Stevens. *Industrial Gas,* v. 31, Jan. 1953, p. 7-9, 28.

Basic description of controlled atmospheres and why they are necessary in many operations. Carbon control and muffle-type furnace for heating steel. Photographs. (J2, ST)

41-J. Many Common Metals Successfully Treated in Steam Atmospheres. F. L. Spangler. *Materials & Methods,* v. 37, Jan. 1953, p. 84-86.

Method makes possible scale-free tempering, annealing, and stress relieving. Steel, cast iron, sintered powdered iron compacts, brass, bronze, and Al parts were successfully treated. Photographs. (J2, ST, CI, Cu, Al)

42-J. Distortion. It Can be Minimized in Heat Treating. A. L. Pranses. *Steel,* v. 132, Jan. 26, 1953, p. 70-72.

Extensive study was made of heat treating distortion encountered in manufacture of molds for industrial plastics. Molds were made from SAE 3335 steel modified by addition of 0.20% Mo to make it air hardening. Tables and graphs. (J26, AY)

43-J. Metallurgical Effects of Oxygen Cutting Alloy Steel (Armor Plate). F. C. Saacke. *Welding Journal,* v. 32, Jan. 1953, p. 19-30.

Hardenability of armor plate due to O_2 cutting, physical characteristics of cut edges and residual stresses resulting from cutting operation. Graphs, tables, micro- and macrographs. (J26, Q25, G22, AY)

44-J. Flame Hardening of Large Diameter Thin-Wall Cylindrical Shells. Gustave A. Weber. *Welding Journal,* v. 32, Jan. 1953, p. 37-43.

Adoption of flame hardening process to progressively "through harden" thin-walled cylinders with minimum distortion with equipment now in use. (J2)

45-J. Strip Annealing Is High-Speed, Continuous in Direct-Fired Radiant-Gas Mill Equipment. Charles A. Turner, Jr. *American Gas Journal,* v. 178, Jan. 1953, p. 16-19.

Advantages of this method in producing tinplate. (J23, CN)

46-J. Effect of Heat Treatment and Related Factors on Straight-Chromium Stainless Steels. *Corrosion,* v. 9, Feb. 1953, p. 56-65.

General relationship between structural changes caused by heat treatment and hardness, toughness and corrosion resistance; specific data are given for each grade. Graphs and tables. (J general, Q29, R general, SS)

47-J. (French.) **Importance of Heat Treatment in the Creep Resistance of Steel.** G. Delbart and M. Ravery. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 92, 6 pages.

Studies using a Cr-Mo steel. Temperature influence, 1000-hr. tests, and influence of lengthy preheating on high-carbon Cr-Mo steels. Tables and charts. (J general, Q3, AY)

48-J. (French.) **Electrical Heating of Furnaces With Controlled Atmosphere.** R. Henrion. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 106, 6 pages.

Metallic muffle furnaces, furnaces with tight outer shells, and the advantages of electric heating for temperatures above 800° C. Photographs. (J2)

49-J. (French.) **Conditions for Using the Oxy-Acetylene Flame in Surface Hardening.** Marcel Vilez. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 123, 7 pages.

Discusses, in particular, instantaneous general hardening. Graphs. (J2)

50-J. (French.) **Furnaces for Isothermal Treatment and for Quenching of Successive Stages.** G. E. Stempfel. *Fourth International Congress on Industrial Heating* (Paris), No. 207, 5 pages.

Furnaces for temperatures less than 250° C., furnaces for bath quenching, quenching of high speed steels by successive stages, and isothermal annealing between 650 and 700° C. (J26, TS)

51-J. Continuous Heat Treatment Process Produces High Strength Oil Well Casing. F. H. Bremmer and F. J. Zehnder. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 55-62; disc., p. 62-64.

Production method of manufacturing high strength quenched and tempered oil-well casing from plain carbon steel. (J26, CN)

52-J. Thermal Stabilization of Austenite in Carburizing Steels. H. M. Otte and T. Ko. *Journal of the Iron and Steel Institute,* v. 173, Jan. 1953, p. 31-35.

Study made of retained austenite in two carburized steels. Graphs. 19 ref. (J23, AY)

53-J. Transformation Characteristics of 3 Pct Al-5 Pct Cr Titanium Alloy. Lee S. Busch. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 146-149.

Investigation to determine effects of isothermal heat treatment on physical properties in tension, microstructure, machinability, and weldability. Micrographs and graphs. (J26, N8, Q general, Ti)

54-J. Practical Metallurgy, "Down-Under". Arthur S. Reardon. *Metal Progress,* v. 63, Jan. 1953, p. 99-102.

Postwar heat treating equipment and techniques in Australia. (J general, TS)

55-J. Hardenability Bands for Tentative Standards. *Metal Progress,* v. 63, Jan. 1953, p. 114-B.

Data sheet. (J26, AY)

56-J. Carbonitriding. D. M. Dovey and K. C. Randle. *Metal Treatment*

and Drop Forging, v. 19, Dec. 1952, p. 511-518; v. 20, Jan. 1953, p. 11-14.

Principles of salt-bath cyaniding, gas carbonitriding, effect of gas composition, time, temperature, and heat treatment of carbonitrided cases. Part II: Technique of carbonitriding and suitable atmospheres, and types of generators available. Some furnaces designed for carbonitriding. Graphs, tables, and micrographs. 7 ref. (J28, ST)

57-J. Induction Fixture Permits Selective Surface Hardening. J. F. Libsch. *Metal-Working,* v. 9, Feb. 1953, p. 6-7.

A new, rapid and efficient method. Photographs and graphs. (J2, CN)

58-J. (Pamphlet.) **Nitriding and Carbonitriding of Titanium Metal and Its Alloys.** Edmond J. Silk. Sam Tour & Co., Inc., (New York City), P#2282, R# 9459, Copy No. 41, May 12, 1952, 21 pages.

Describes equipment used for nitriding experiments on Ti and its alloys. Results of experiments on RC-55 ductile Ti and several higher strength alloys. Graphs and micrographs. (J28, Ti)

59-J. Development, Principles, and Applications of Interrupted Quench Hardening. Richard F. Harvey. *Journal of the Franklin Institute,* v. 255, Feb. 1953, p. 93-99.

General discussion of quench hardening steel. 10 ref. (J26, ST)

60-J. Salt Versus Atmosphere Annealing. E. S. Tyler. *Wire and Wire Products,* v. 28, Feb. 1953, p. 156-157, 219-222.

Merits and weaknesses of batch-type salt bath and retort or bell-type atmosphere annealing. (J2)

61-J. Flame Hardening Using Oxy-Town Gas. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 31, 1953, p. 103-105.

Advantages. (J2, CN)

62-J. How Cold Treatments Improve Performance of Materials. John L. Everhart. *Materials & Methods,* v. 37, Feb. 1953, p. 115-118.

How refrigeration is used to stabilize steel; to form shrink fits; to prevent aging of Al; and during machining and grinding. Photographs. (J2, G17, ST, Al)

63-J. (English.) **High Frequency Hardening of Steel.** *Aciers Fins et Spéciaux Francais,* Dec. 1952, p. 46-50.

Principles of process, types of heating units, design of heating coils, and suitability of various steels for this treatment. (J2, CN, AY)

64-J. Short Cycle for Hardening High-C, High-Cr Toolsteel. J. Y. Riedel. *Metal Progress,* v. 63, Feb. 1953, p. 67-70.

Practical short-time cycle in which austenitization is accomplished by heating at a relatively high temperature. (J26, TS)

65-J. Natural Gas and Propane-Air Gas in the Heat Treating Industry. Paul E. Peacock, Jr. *Metal Treating,* v. 4, Jan.-Feb. 1953, p. 2-3, 25.

Advantages and equipment. Diagrams and photographs. (J2)

66-J. Sub-Zero Treatment of Metals for Stabilization. R. S. Jamison. *Metal Treating,* v. 4, Jan.-Feb. 1953, p. 4-5.

Advantages of process which can be applied to various carbon and alloy steels as well as to cast iron stainless steel, and Al. (J2, CN, AY, SS, CI, Al)

67-J. Heat Treatment of Ductile Cast Iron. K. D. Millis. *Metal Treating,* v. 4, Jan.-Feb. 1953, p. 6-8.

Annealing and quench treatments. Micrographs. (J23, J26, CI)

68-J. New Continuous Heat-Treatment Installations at Vauxhall Motors Ltd., Luton. C. F. Milward. *Metal Treatment and Drop Forging,* v. 20, Feb. 1953, p. 51-55.

Survey is made of new installations for diverse heat treatment processes for steel forgings. Includes normalizing, pack carburizing, and cyanide hardening. Photographs. (J24, J26, J28, ST)

69-J. Salt v. Lead Patenting of Steel Wire. J. G. Wistreich. *Metal Treatment and Drop Forging,* v 20, Feb. 1953, p. 69-70.

Reviews investigation to determine whether salt and lead patented high-tensile wires are of comparable quality. (J25, ST)

70-J. Nitriding as a Production Tool. Lester F. Spencer. *Modern Machine Shop,* v. 25, Feb. 1953, p. 146-148, 150, 152, 154, 156, 158, 160; Mar. 1953, p. 160-168, 170.

The nitriding process and materials on which it may be used. Part 2: Equipment and recommended methods for processing work. Graphs, tables, and photographs. 12 ref. (J28, AY)

71-J. Induction Heating Cuts Costs on Many Fronts. *Steel,* v. 132, Mar. 23, 1953, p. 80-82.

Manufacturers are taking advantage of modern induction heating techniques to improve quality, increase production, and lower costs in many types of operations. Photographs. (J2)

72-J. Carburizing, Nitriding, and Siliconizing of Tungstenized and Molybdenized Cases on Iron and Steel. E. Fitzer. Henry Brutcher Translation 2982, 18 pages.

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 276-J, 1952. (J28, L15, ST, Fe)

73-J. Centralised Heat Treatment Equipment for Mining Gear. C. P. MacCarthy. *Colliery Guardian,* v. 186, Mar. 19, 1953, p. 343-346.

Furnace equipment, degreasing, inspection, and examination. (J general, L12, CN)

74-J. Job Lot Heat Treating Accomplished Easily by Versatile Pit Type Furnace. *Industrial Gas,* v. 31, Mar. 1953, p. 10, 27-28.

Features such as wide temperature range of 400 to 1800° F., controlled atmosphere, and basement installations. Diagrams and photographs. (J general)

75-J. Industrial Electric Furnaces. J. C. Howard. *Journal of the Iron and Steel Institute,* v. 173, Mar. 1953, p. 285-291.

Use of electric energy for metallurgical heating purposes; possible future trends in development and application. Discusses arc, resistance, and induction furnaces. (J general)

76-J. Salt Bath Case Hardening With Molybdenum and Tungsten. A Correlated Abstract. *Materials & Methods,* v. 37, Mar. 1953, p. 94-97.

Recent developments for improving surface properties of irons and steels by increasing W or Mo content of the surface layers. Tables and graphs. (J28, AY, TS)

77-J. Armor Plate Quenched in Hydraulic Press. *Modern Industrial Press,* v. 15, Mar. 1953, p. 24, 26.

A 2500-ton unit is set between hardening and draw furnaces with handling done on roller conveyors. Most plates are flat quenched but some are form quenched in dies. Photographs. (J26, AY)

78-J. Hardening of Metals. J. L. Meijering. *Philips Technical Review,* v. 14, Jan. 1953, p. 203-211.

Thermal methods of hardening after forming, such as quench hardening, precipitation hardening, and oxidation hardening are discussed and illustrated. Micrographs. (J26, J27)

79-J. Valley Wire Mill Modernizes Annealing Practice. Edmund D. Sickels. *Wire and Wire Products,* v. 28, Mar. 1953, p. 264-265.

Furnace used for heat treatment of various Cu-base alloys. Photographs. (J23, Cu)

80-J. (French.) **Substitution of Boron for Alloying Elements in Carburizing and Heat Treating Steels.** Robert Scherer and Karl Bungardt. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 73-91; disc., p. 91-94.

Effect of B on hardenability and impact value of Cr-Mo and Cr-Ni carburized plates 50 mm thick. (J26, Q6, Cr)

81-J. What the Ferrous Metallurgist Should Know About Titanium. R. I. Jaffee. *Iron Age,* v. 171, Apr. 2, 1953, p. 162-166.

Discusses properties and structure of Ti and alloys to explain why they can't be quench hardened. (J26, Q general, M27, Ti)

82-J. Heat-Treatment of Newer En. Steels. R. Wilcock. *Metal Treatment and Drop Forging,* v. 20, Mar. 1953, p. 113-117; disc., p. 117-118.

Changes in heat treatment of direct hardening and casehardening steels. Tables and graphs. (J26, J28, ST)

83-J. Gas Carburizing Plant. *Overseas Engineer,* v. 26, Apr. 1953, p. 316-317.

Re-equipping a Netherlands plant with British equipment made to reduce distortion. Photographs. (J28)

84-J. Dual Frequency Heating. Lower Costs Open New Fields. M. E. Hackstedde. *Steel,* v. 132, Apr. 13, 1953, p. 140-141.

Low-frequency coils in tandem with high-frequency high-heat coils prove that induction heating can be practical in forging applications. Photographs. (J2, F22)

85-J. Induction Heating. Lester F. Spencer. *Steel Processing,* v. 39, Jan. 1953, p. 22-28, 42-43; Feb. 1953, p. 71-75.

Types of equipment for use as a heating medium for hot working, hardening or annealing, and joining of metals. Photographs and diagrams. 26 ref. (J2, F22, K8)

86-J. Heat Treating Round-Up for 1952. Howard E. Boyer. *Steel Processing,* v. 39, Jan. 1953, p. 30-36.

Developments and improvements in heat treating furnace equipment. Photographs. (J general)

87-J. The Salt Bath—a Production Tool. Lester F. Spencer. *Steel Processing,* v. 39, Mar. 1953, p. 120-130, 144.

Advantages of the salt bath, whether batch or mechanized. Photographs and diagrams. (J2)

88-J. Carbide Formation in Alloy Steels During High Tempering. G. V. Kurdyumov and M. D. Perkas. Henry Brutcher Translation 3014, 6 pages. (From *Doklady Akademii Nauk SSSR,* v. 87, no. 1, 1952, p. 41-43.)

Data on steel hardness as function of tempering temperature, results of X-ray study of carbide residues, and tempering temperatures at which special carbides are formed. Steels containing 0.11% C, 1.40% V, 1.48% Mn; and 0.10% C, 2.14% Mo were studied. (J29, AY)

89-J. (German.) **Fundamental Considerations on Annealing of Cold-Rolled Steel Strip.** A. Pomp. *Stahl und Eisen,* v. 73, Jan. 29, 1953, p. 133-138.
General discussion including effects of annealing temperature and time; previous cold deformation; and rate of cooling on structure and properties of cold rolled strip steels of medium and high carbon.
(J23, CN)

90-J. (German.) **Experience With Four-Chambered Pot Annealing Furnaces.** Werner Feige and Alfred Neuhaus. *Stahl und Eisen,* v. 73, Jan. 29, 1953, p. 139-147.
Cloverleaf furnaces and their operation for annealing steel coils. Superheating the outer windings did not affect toughness. Yield was doubled, making possible 1-2 tons per hr. Diagrams, charts, photographs, and tables. 8 ref. (J23, ST)

91-J. (German.) **Design, Operation, and Annealing Results of an Electrically Heated Continuous Roller-Hearth Annealing Furnace for Cold Rolled Strip in Coils.** Josef Keutmann and Hans Martin Junius. *Stahl und Eisen,* v. 73, Jan. 29, 1953, p. 147-158.
New annealing process features continuous heating of coils from both edges. Construction and operation of furnace. Power consumption and calculated efficiencies. Photographs. (J23, ST)

92-J. (Book—Russian.) **Dimensional Change of Steel From Thermochemical Treatment. Carburizing and Nitriding.** S. F. Yurev. 308 pages. 1950. Governmental Scientific - Technical Publishing House, Moscow, U.S.S.R.
Complex mathematical analyses for dimensional change of various shapes during nitriding and carburizing are deduced from data obtained from differential dilatometry.
(J28. ST)

93-J. Hardening Gray Cast Iron With Minimum Distortion. A. A. Armstrong. *American Foundryman,* v. 23, Apr. 1953, p. 142-144.
Methods of hardening cast iron. Some advantages and limitations of oil quenching and tempering; martempering; and austempering. Control of warpage in hardened cylinder liners is discussed with reference to the TTT-curve. (J26, CI)

94-J. Syracuse Heat Treating Corp. Boasts Eight Factors for Success. Ralph L. Manier. *Industrial Gas,* v. 31, Apr. 1953, p. 6-7, 26-27.
Describes furnace equipment. Photographs. (J general)

95-J. Dual - Frequency Induction Heating Lowers Process Costs. R. S. Segsworth. *Iron Age,* v. 171, Apr. 16, 1953, p. 113-116.
Methods and equipment for forging, heat treating, and melting. Diagrams and photographs.
(J2, F21, E10)

96-J. Flame-Hardened Engine Parts for High Production. Herbert Chase. *Materials & Methods,* v. 37, Apr. 1953, p. 90-92.
Process of selective surface hardening used on steel and malleable iron parts. Photographs.
(J2, CN, CI)

97-J. Modern Bell-Type, Bright-Annealing Furnace With Heat Recuperation. Johann Arens. *Draht* (English Ed.), Mar. 1953, p. 40-42.
Furnace and method of operation. Diagrams. (J23)

98-J. (German.) **Application of Isothermal Heat Treatment to Mn-Si Spring Steel.** P. G. Boting. *Metalen,* v. 8, Jan. 31, 1953, p. 21-25.
Quench-hardening and bend tests which illustrate increase in ductility of isothermally hardened material. Graphs, tables, and micrographs.
(J26, Q23, AY)

99-J. Gas Carburizing. Methods Employed by the Rover Co. Ltd. for Crown Wheels and Pinions. *Automobile Engineer,* v. 43, Apr. 1953, p. 149-151.
Equipment used. Photographs.
(J28, CN)

100-J. Uniform Annealed Grain Size Obtained With Radiant-Roof Furnace. C. R. MacWhirter. *Iron Age,* v. 171, Apr. 23, 1953, p. 144-146.
Pan-type annealing furnace which keeps work temperatures uniform across the hearth. Brass was used to illustrate grain growth. Photographs and micrographs.
(J23, N3, Cu)

101-J. Automatic Plant Arranged for Flowline Treatment of Precision Chain Components. P. Chant and H. J. Tucker. *Machinery* (London), v. 82, Apr. 10, 1953, p. 663-669.
Variety of components produced, precision of processes, uniformity of heat treatment, and handling methods. Photographs and diagrams. (J general, A5)

102-J. Some Recent Alloy Steels and Their Heat Treatment. William C. Mearns. *Metal Treating,* v. 4, Mar.-Apr. 1953, p. 2-4, 10.
Composition, properties, and heat treatment of age hardening and extra high strength steels
(J general, Q general, AY)

103-J. Distortion Control and Hot Oil Quenching. F. E. Harris. *Metal Treating,* v. 4, Mar.-Apr. 1953, p. 5, 10.

Factors causing distortion in steel parts and procedures for quenching. (J26, ST)

104-J. Roller Hearth Furnaces Toughen Tank Feet. H. M. Webber. *Steel,* v. 132, Apr. 27, 1953, p. 100-101.

Furnace installations involving copper brazing, partial cooling, reheating, and oil quenching of tank track bodies and shoes. Photographs. (J26, K8, ST)

105-J. Pressure Nitriding for Hardening Internal or External Surfaces. R. L. Chenault and G. E. Mohnkern. *Metal Progress,* v. 63, Apr. 1953, p. 97-105.

Process which is applicable to many steel parts requiring high surface hardness, wear resistance, and accuracy of dimension. Graphs, diagrams, and photographs. (J28, ST)

106-J. Why Two "Specs" Covering Aluminum Heat Treatment. James McElgin. *Western Machinery and Steel World,* v. 44, Apr. 1953, p. 94-95.

Discusses specification MIL-S-10699 which is considered to be more accurate than MIL-H-6088. (J general, Al)

107-J. Good Handling Speeds Heat Treating of Small Parts. Herbert Chase. *Iron Age,* v. 171, May 14, 1953, p. 141-143.

Use of belt-conveyors and a novel feeding device for eliminating guesswork and manual labor from heat treating small cold-headed parts. Photographs. (J general)

108-J. (French.) **Devices for Automatically Counterbalancing Furnace Doors.** M. Barbas. *Flamme et Thermique,* v. 6, No. 54, Mar. 1933, p. 13-20.

Fifty years of progress as shown by performance of modern furnaces. Photographs, diagrams, tables. 1 ref. (J general)

109-J. Close Control of All Variables in Heat Treating Landing Gear Struts. Merle W. McLaughlin. *Automotive Industries,* v. 108, May 15, 1953, p. 53, 114 116.

Facilities and setup for heat treating SAE 4140, 4130 or 4340 steel parts. (J general, AY)

110-J. The Formation of Intracrystalline Voids in Solution-Treated Magnesium-Aluminium Alloys. E. Lardner. *Institute of Metals, Journal,* v. 81, May 1953, p. 439-442.

In a sample of an alloy that forms cavities, the cavity formation increases to a maximum and then eventually vanishes with increasing homogenization. Cavities are probably produced on cooling after solution treatment rather than during the progress of the heat treatment. (J27, Mg, Al)

111-J. (French.) **Burning of Light Alloy Castings During Hardening.** Henry Garnier. *Fonderie,* no. 85, Feb. 1953, p. 3307-3312.

Detection, mechanism of deterioration, and possible methods of control. Tables, micrographs, photographs. (J26, Al, Mg)

112-J. (German.) **The Annealing of Colors on Powders, Stability of Annealed Layers on Copper and Iron, and Solubility of Oxygen in Copper at Higher Temperatures.** M. Clasing, and F. Sauerwald. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 81-87.

A study was made of the stability of oxide films formed during annealing. New data are presented for the solubility of O_2 in Cu. 11 ref. (J23, H12, Cu, Fe)

113-J. Why Uniform Heat Treatment is Essential in Artificially Aging Aluminum Alloys. C. W. Alesch. *Industrial Gas,* v. 31, May 1953, p. 3-5, 24-25.

Precipitation hardening of Al alloys sensitive to time-temperature conditions. Shows that precise controls are most important. Photographs. (J27, Al)

114-J. Heat Treatment of Stainless Steels. Lester F. Spencer. *Industrial Heating,* v. 20, Jan. 1953, p. 42, 44, 46, 48, 50; Feb. 1953, p. 220-222, 224; Apr. 1953, p. 678, 680, 682, 684, 686, 688, 690; May 1953, p. 879-880, 882, 884.

Part I discusses and tabulates information for Ni or austenitic grades of stainless steels, hardenable or martensitic grades, and nonhardening or ferritic group. Part II considers types of furnaces and practices recommended for heat treating stainless steels. Part III outlines heat treating cycles for three basic types of stainless steels. Part IV discusses nitriding stainless steels by the "Malcomizing" treatment and pickling and passivation after heat treatment. (J general, L12, R10, Ni, SS)

115-J. A Survey of Industrial Carbonitriding Practice. M. B. Bever, C. F. Floe, and W. G. Zaruba. *Industrial Heating,* v. 20, Feb. 1953, p. 256, 258, 260, 262, 264; Apr. 1953, p. 650, 652, 654, 656, 658, 660; May 1953, p. 872, 874, 994.

Part I outlines general applications of the carbonitriding practice as determined by a survey of 15 industrial installations. Part II describes furnaces, atmospheres, and cycles used in industrial carbonitriding. Part III covers properties, inspection, and service performance. (J28)

116-J. Stress-Relieving of World's Largest Air Compressor Discs. L. E. Anderson and J. F. McCarthy. *Industrial Heating,* v. 20, May 1953, p. 862, 864, 866, 868, 870, 1000.

Furnace for stress-relieving huge rotor disks. Photographs. (J1)

117-J. Precise Heat Treatment of Jarvis High-Speed Taps. *Industrial Heating,* v. 20, May 1953, p. 892, 894.

Equipment for heat treating W. Mo, and Co high speed steel ground thread taps. (J general, TS)

118-J. Automatic Furnace Heat Treats High-Strength Torsion Bars. Russell Graham. *Iron Age,* v. 171, May 21, 1953, p. 129-132.

Furnaces and equipment. Illustrated. (J general)

119-J. Properties and Manufacture of Valve Steels for the Automotive Industry. (Concluded). J. Cameron. *Metal Treatment and Drop Forging,* v. 20, May 1953, p. 213-218.

Effect of heat treatment on a number of steels. Data were collected from experimental work. (J general. T21, ST)

120-J. Instrumentation Simplifies Annealing. Hugh C. McKinnon. *Steel,* v. 132, May 25, 1953, p. 128, 130.

Shows that precise control of fuel mix and temperature in a 4-zone sheet and plate furnace promotes uniformity in the various physical values. (J23, SS, TS)

121-J. Influence of Furnace Atmosphere on the Annealing of Malleable Iron. J. T. Bryce, A. Hernandez, and F. B. Rote. American Foundrymen's Society, Preprint 53-6, 1953, 11 p.

Effect of surface decarburization on mechanical properties. Nodule formation, pearlitic rim, and annealing rate are treated. Micrographs. (J23, CI)

122-J. Hardening Characteristics of Induction Heated Ductile Iron. Edward P. Rowady, William J. Murphy, and Joseph F. Libsch. American Foundrymen's Society, Preprint 53-31, 1953, 10 p.

Experiments on the influence of prior structure on the response to induction hardening. (J2, CI)

123-J. Low-Temperature Treatments Improve Products and Processes. W. H. Miller. *Iron Age,* v. 171, May 28, 1953, p. 121-125.

Cold treating of metal products to aid fabrication. Dimensional stabilization of precision parts; improved strength and accuracy of tools and machine parts; better machinability; and improved metallurgical properties are advantages of low-temperature treatment. (J26, Q general, Mg, Al, TS, AY)

124-J. Annealing Bombardment Damage in Solids. W. L. Brown, R. C. Fletcher, and S. Machlup. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 709-710.

Analytical expression for the annealing of isolated interstitial vacancy pairs which are presumably introduced by bombardment with particles having energies just slightly higher than threshold. (J23, M25)

125-J. Natural Gas. A Switch for Heat Treating. *Steel,* v. 132, June 1, 1953, p. 169-170.

How change from bottled gas to natural gas reduced cost of a heat treating operation. (J2)

126-J. New Heat Treat Line Meets Many Varying Requirements. *Steel Processing,* v. 39, May 1953, p. 243-245, 251.

Continuous harden, quench, and draw line. Functional and structural parts for engines, tractors, aircraft, road and construction equipment, as well as many other products are heat treated with this new installation. Photographs. (J general, AY, SS, TS)

127-J. How to Cure Protective Atmosphere Troubles. A. G. Hotchkiss and H. M. Webber. *American Machinist,* v. 97, June 8, 1953, p. 153-168.

Testing for leaks in furnaces; controlling and testing for decarburization; how to take gas samples for analysis; how protective atmospheres affect heating units and thermocouples; and effect of CO on refractories and personnel. Provides check sheet for troubles and cures in operation of protective-atmosphere furnaces. Graphs, tables, photographs. (J2)

128-J. High Frequency Induction Heating. H. A. Codelli. *Canadian Metals,* v. 16, Apr. 1953, p. 18, 20; May 20, 1953, p. 24, 26.

Shows that induction heating in sub radio-frequency range can be used effectively and economically to replace conventional methods of brazing, soldering, hardening, carburizing, and other forms of heat treatment. Chief advantages are speed, versatility, and cleanliness. Joining operations and specific applications. (J2, K7, K8)

129-J. Magnetic Annealing of a Co-Fe Alloy. A. H. Geisler, J. P. Martin, Eberhard Both, and J. H. Crede. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 813-820.

Investigation of a 50% Co alloy to determine whether there was any direct correlation between the structure and properties of Co-Fe alloys which were given various magentic

heat treatments. Diagrams, tables. 8 ref. (J23, P16, Co)

130-J. Specialized Machines, Torches Employed by National Supply to Flame Harden Oil Well Units. Todd Gardner and Hugh H. Foreman. *Western Metals,* v. 11, June 1953, p. 52-53.

Objectives, advantages, and types of flame hardening. (J2, CN, AY)

131-J. Proper Racking, Jigging & Checking Important Factors in Heat Treating Aluminum Alloys. W. P. Reno and William "Bill" Barcoff. *Western Metals,* v. 11, June 1953, p. 58-60.

Problems of holding down distortion and corrosion by dip and spray water quench. (J26, R5, Al)

132-J. Forming and Heat Treating Harrow Teeth at Mid-West Forging and Manufacturing Co. *Industrial Heating,* v. 20, June 1953, p. 1068, 1070, 1072, 1074.

Procedure. Photographs. (J general, G general)

133-J. Versatile Furnace Installation for Job Lot Heat Treatment. *Industrial Heating,* v. 20, June 1953, p. 1102, 1104, 1106, 1166.

Features and capacity of the furnace. Photographs. (J general)

134-J. Unsatisfactory Heat Treating Results. Their Causes and Prevention. M. Balicki and A. O. Moelk. *Metal Treating,* v. 4, May-June 1953, p. 2-4.

Lists and classifies unsatisfactory results. Defines causes responsible for the conditions. (J general)

135-J. Features Most Desirable in Batch Carbonitriding Equipment. George C. McCormick and Clifton E. Wenger. *Metal Treating,* v. 4, May-June 1953, p. 5-6.

Features which such equipment should contain and why they are important. Micrographs. (J28)

136-J. Stress-Relieving Furnace at Birkenhead. *Welding and Metal Fabrication,* v. 21, June 1953, p. 205-206.

Briefly described. (J1)

137-J. (French.) **International Institute of Welding. Residual Stresses and Relaxation of Stresses.** L. E. Benson, M. Hansen, and H. Harris. *Soudure et Techniques connexes,* v. 7, no. 3-4, Mar.-Apr. 1953, p. 85-86.

Summary of replies to questionnaire on stress relieving regulations and practice in different countries. (J1, Q25)

138-J. (German.) **Internally Heated Salt-Bath Furnace for Heat-Treating and Age-Hardening Light-Metal Alloys.** Ed. Zeitz. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 161-163.

Design and economy. Illustrated. Tables, graphs. (J2, Al)

139-J. (German.) **Annealing Tests on Cold-Rolled Low-Alloy Strip Steels in Pot, Muffle, and Continuous-Annealing Furnaces.** Anton Pomp, Georg Niebch, and Jacques Gerhard Brockhaus. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 646-653.

Elaborates on tests of six strip steels. Changes in tensile strength, yield point, and elongation caused by heat treatment are considered with respect to soft annealing. Graphs, tables. 10 ref. (J23, Q23, AY)

140-J. (German.) **Micro-Induction Hardening With High-Frequency Impulses.** W. Thorwart. *Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 11-12, Apr. 15, 1953, p. 341-344.

Use of high-frequency current for close control of place, extent, and degree of hardness of small parts for machines and instruments. Graphs, photographs. (J2, CN)

141-J. (Book.) **Equipment for the Thermal Treatment of Non-Ferrous Metals and Alloys.** 104 p. 1953. Institute of Metals, 4 Grosvenor Gardens, London S.W.1, England. $2.50.

A compilation of the papers presented at the annual general meeting of the Institute. (J general, Cu, Ni, Al, EG-a)

142-J. Unfailing Proof of Heat Treatment. Wayne Martin. *Electrical Manufacturing,* v. 52, July 1953, p. 292, 294.

Method of indicating when a satisfactory heat treating operation has been performed on a part. (J general, Al)

143-J. From Mammoth to Miniature. Albert L. Neudoerffer. *Instrumentation,* v. 6, 2nd qtr., 1953, p. 8-9.

Effective control of hardening contributes to higher quality of bearings. Photographs. (J general, AY, TS)

144-J. Gas Nitrided 4140 Case is Tougher. J. G. Morrison. *Iron Age,* v. 172, July 9, 1953, p. 129-134.

Case hardening technique and mechanical properties. Tables, diagrams. (J28, Q general, AY)

145-J. Double-End Batch Furnaces Speed Heat Treatment of Small Parts. *Iron Age,* v. 172, July 2, 1953, p. 136-137.

Rigid heat treating cycles and program control for treating small carbon-graphite parts. Photographs. (J general)

146-J. Special Furnaces for Heat Treatment of Metals. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 182-187.

Types of furnaces for heat treatment of special alloys. Photographs. (J general, Al, Ni, Cr, TS)

147-J. Heat-Treatment Furnace Developments. *Metallurgia,* v. 47, no. 283, May 1953, p. 247-262, 274.
Recent installations for ferrous and nonferrous metals. Reviews progress in furnace design. Photographs. (J general, Cu, Al, ST)

148-J. Automatic Control of Fuel-Air Ratio in Metallurgical Furnaces. Leo Walter. *Metallurgia,* v. 47, June 1953, p. 307-309.
Characteristics of ratio controllers and four typical applications. Diagrams. (J general)

149-J. Structures and Properties of Some Carbo-Nitrided Cases. K. B. Valentine. *Metal Progress,* v. 63, June 1953, p. 97-103.
Four methods of carbonitriding were used with C1024, 4028, 4620, 5120, TS8120, TS81B20, 8620, and 9415 steels. Bending load properties, impact fatigue properties, microhardness of case, and microstructure were then determined. Diagrams, micrographs, tables.
(J28, Q general, ST)

150-J. Induction Heating Helps Produce Better Gears. L. G. Miller. *Metal Progress,* v. 63, June 1953, p. 109-110, 179.
Use of a vacuum-tube type induction heater for heat treating gears. (J2, CN)

151-J. To What Extent Does Stress Relieving Occur at 200-300° C? R. Gunnert. *Welding Journal,* v. 32, June 1953, p. 292s-301s; disc. p. 301s.
Series of tests. Graphs, diagrams. (J1)

152-J. On the Use of Alternating Current in the Electromechanical Surface Hardening of Tools and Machine Elements. L. Ya. Popilov. Henry Brutcher Translation 2977, 5 pages. (From *Vestnik Mashinostroeniya,* v. 32, 1952, no. 9, p. 60-61.)
Compares the direct and alternating current electromechanical surface hardening process. Table.
(J28, Fe, CN)

153-J. (German.) **Magnetic Regulation of Heat Treatment of Toolsteels in Mass Production.** Helmut Krainer and Ekkehart Krainer. *Archiv fur das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 127-131.
Magnetic properties of toolsteel were tested at various tempering states. Inductive testing is rapid and convenient. Photographs, graphs. 21 ref. (J29, P16, TS)

154-J. Flame Hardening of Cast Iron. M. R. Scott. *American Foundryman,* v. 24, July 1953, p. 52-56.
Process for cast iron and steel used for machine bases, ways, gibs, etc. Photographs, micrographs.
(J2, CI)

155-J. Continuous Normalizing, Hardening and Tempering at Kropp Forge Co. *Industrial Heating,* v. 20, July 1953, p. 1264-1266, 1268, 1270, 1272.
Three integrated furnaces for special forgings. Photographs.
(J24, J26, J29, AY)

156-J. Production Heat Treatment of Motorcycle Parts. *Industrial Heating,* v. 20, July 1953, p. 1295-1296, 1298, 1300. 1382.
Heat treating furnaces, annealing, inspection, and testing of special parts. Photographs. (J general, AY)

157-J. — Rotary Furnace Features Floating Hearth. R. E Greenawalt. *Industrial Heating,* v. 20, July 1953, p. 1320-1322, 1324, 1326, 1328, 1330.
Hearth construction and operation. Diagram, photographs.
(J general)

158-J. Better Heat Treating for Better Bearings. Herb Habart. *Iron Age,* v. 172, July 16, 1953, p. 131-135.
Process which combines freezing and heat treatment of low alloy steels. Micrographs.
(J general, AY)

159-J. Efco Heat Treatment Division. *Machinery (London),* v. 83, July 10, 1953, p. 83-85.
Layout and equipment. Photographs. (J general)

160-J. Annealing Type 414 Stainless Steel Forging. Anthony A. Scafati. *Materials & Methods,* v. 38, July 1953, p. 78-79.
Optimum hardness and machinability can be obtained with 2-stage annealing procedure. Photographs.
(J23, SS)

161-J. Comparison of Tests for Hardenability of Shallow-Hardening Steels. G. K. Manning. *SAE Journal,* v. 61, July 1953, p. 30-36.
Based on "Jominy and SAE Hardenability Tests on Seven Shallow-Hardening Steels". A cooperative program among ten laboratories sponsored by SAE Iron and Steel Technical Committee Division V. Graphs. (J26, CN, AY)

162-J. Tool Steels for Press Tools and Shear Blades in Sheet-Metal Fabrication. (Concluded.) R S. Watts. *Sheet Metal Industries,* v. 30, July 1953, p. 553-565.
Hardening and tempering.
(J26, J29, T5, TS)

163-J. (Dutch.) **Various Aspects of Gas Carburizing and Carbonitriding.** C. H. Luiten. *Metalen,* v. 8, no. 5, Mar. 14, 1953, p. 91-97.
Processes and conditions affecting them. Diagrams, graphs. (J28)

164-J. (Italian.) **Heat Treatment of Armor Plates for Battleships.** Leo-

poldo Malvezzi. *Metallurgia Italiana,* v. 45, no. 4, Apr. 1953, p. 133-138.

A review of heat treatment and fabrication of naval armor plate. Diagrams, graphs, photographs, tables. 4 ref. (J general)

165-J. (Russian.) **Mechanism of Artificial Aging of Al-Cu-Mg Alloy.** Iu. A. Bagariatskii. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 3, Nov. 21, 1952, p. 397-401.

X-ray structural analysis and microscope methods are used in the study of artificially aged aluminum alloys. Microphotographs. 10 ref. (J27, M27, Al)

166-J. (Book.) **Principles of Heat Treatment. Rev. Ed.** M. A. Grossmann. 303 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Discusses what happens when steel is heated from room temperature until it is red hot and is then cooled back to room temperature at different rates. (J general, ST)

167-J. A High-Frequency Bar Stock Hardening Machine. *Engineer,* v. 196, July 17, 1953, p. 88.

Apparatus designed for surface hardening of steel bars. (J28, CN)

168-J. Heat Treating by Prescription. Cornelius Ackerson. *Industrial Gas,* v. 32, July 1953, p. 14-15, 25, 27.

Modern equipment used in heat treating. Photographs. (J general, Cu, Ag)

169-J. Developments in Induction Heating. New Efco Works at Burton-on-Trent. *Metal Treatment and Drop Forging,* v. 20, July 1953, p. 325-326.

Heat treating layout and equipment. (J2)

170-J. Gas Heat Anneals and Brazes Connectors. *Metal Working,* v. 9, Aug. 1953, p. 8-9.

Selection of burners to provide efficiency and economy. Photographs. (J23, K8)

171-J. Heat Treatment of Steel. Frank Bowman. *Mines Magazine,* v. 43, May 1953, p. 23-24, 32.

General reviews. (J general, ST)

172-J. No Waiting in This Long Line. *Steel,* v. 133, Aug. 3, 1953, p. 124-125.

Layout of 365-ft. annealing line. Diagram. (J23)

173-J. Industrial Furnace Design and Application. I.-II. Lester F. Spencer. *Steel Processing,* v. 39, June 1953, p. 286-295; July 1953, p. 345-348.

Factors to be considered in selecting a furnace. Different types available. Photographs. (J general)

174-J. Pack Carburizing Aspects and Developments. I. John E. Hyler. *Steel Processing,* v. 39, July 1953, p. 335-339, 349.

Investment in furnace equipment; development of carburizing compounds; repeated use of compounds; advantages of peach-pit compounds; catalysts; importance of weight and moisture; screening and cleaning compounds; carburizing pots and boxes; and container sizes and shapes. (J28)

175-J. (German.) **Annealing Low-Carbon Cold Rolled Strip Steel in the Continuous Heat Treating Furnace.** Karl-Heinrich Muhr and Anton Pomp. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 885-894.

Effects of different degrees of cold rolling, temperature and time of annealing, and rate of cooling on seven different steels investigated by tensile and drawing tests and by metallographic and X-ray studies. Tables, graphs, photographs. 60 ref. (J23, Q23, M general, CN)

176-J. (German.) **Critical Comparison of the Heat Treating Equipment in Cold Rolling Mills.** Erich Schauff. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 895-902.

Properties and basic problems of heat treating low-carbon strip steel. Advantages and disadvantages of different types of heat treating furnaces. Tables, graphs, diagrams, photographs. (J general, ST)

177-J. (Russian.) **End Heating of Bars With a Stationary Flame of Multi-Row Burners.** N. N. Rykalin and M. Kh. Shorshorov. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 1-6.

Results of study on steel bar heating. Methods of calculation of heating and cooling processes. Photographs, graphs, tables. 4 ref. (J2, ST)

178-J. (Russian.) **Continuous Tempering of Steel Strip Without Surface Oxidation.** E. Z. Ermolchenko and M. G. Rabovskii. *Promyshlennaia Energetika,* v. 9, no. 10, Oct. 1952, p. 7-8.

Furnaces and handling equipment. (J29, ST)

179-J. (Russian.) **Patenting of Steel Wire in Salt and Alkali Baths.** A. Zatev. *Za Ekonomiiu Materialov,* no. 4, Nov. 1952, p. 74-76.

Production data shows that temperature of salt baths should be 50-70° higher when used as a substitute for Pb baths. (J25, ST) eral, L12, Q general, Cu)

180-J. Flux Annealing Removes Gas From Aluminum-Clad Plates. E. J. Boyle. *Iron Age,* v. 172, Aug. 13, 1953, p. 145-147.

Blistering of Al-clad plates caused by H_2 precipitation when heated at 1100° F. can be prevented by flux annealing. Treatment consists of dipping in alcohol slurry of halide

Al brazing flux, drying at 300° F., and heating for 1 hr. at 1100° F. Tables, micrographs. (J23, A1)

181-J. Heat Treating Gears to Meet Rigid Requirements. Ralph Spagnola. *Materials & Methods,* v. 38, Aug. 1953, p. 102-103.

How careful control of carburizing and subsequent heat treatment yields gears with optimum case and core properties. Photographs. (J28)

182-J. (French.) **Martensite Tempering. (Interrupted Martensite Tempering).** R. F. Harvey. *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 483-485.

History of the process, its theoretical conception and its progressive use in industry. Graph. 8 ref. (J29, ST)

183-J. (French.) **Observations on the Firing of Metallurgical Furnaces by Mazut.** Georges Cain. *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 495, 505.

Advantages of heavy oil furnace firing. Photographs. (J general, F1)

184-J. (French.) **Contributions to the Study of Cast Irons With Spheroidal Graphite and Their Applications.** Cornelio Gianola. *Revue de Metallurgie,* v. 50, no. 3, Mar. 1953, p. 199-206.

Influence of heat treatment conditions on the morphology of the spheroids of graphite and the properties of the matrix. Photographs, tables. (J general, CI)

185-J. Gear Hardening by the Induction Method. *Australasian Engineer,* May 7, 1953, p. 89, 91, 93.

High-frequency induction heating. (J2)

186-J. Annealing and Melting With Low-Frequency Induction Heating. K. Frauenfelder. *Brown Boveri Review,* v. 39, Nov.-Dec., 1952, p. 410-420.

Field of low-frequency induction heating in general and some of the latest equipment. Diagrams, graphs, photographs. (J2, D6)

187-J. A New Electric Car-Hearth Furnace for Stress-Relieving Grey Iron Castings and Annealing Ductile Cast Iron. G. Steiner. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 425-428.

Constructional features of a new dual-purpose car-hearth furnace. Diagrams. (J1, C1)

188-J. Electric Heat Treatment Installations. F. Treichler. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 442-451.

Various methods of heat treating tool and other steels as well as the practical requirements which have to be met in the selection of furnaces. Layout of heat treatment installations. Photographs. (J general, TS, ST)

189-J. Clean Normalizing of Welded Tubing at Ford Mound Road Plant. *Industrial Heating,* v. 20, Aug. 1953, p. 1472-1474, 1476, 1478, 1638, 1640.

Normalizing process and equipment. Photographs. (J24)

190-J. An Evaluation of the Hardening Power of Quenching Media for Steel. I. Earl J. Eckel, Ross M. Mayfield, Glen W. Wenson, and Frank A. Rough. *Industrial Heating,* v. 20, Aug. 1953, p. 1482-1484, 1486, 1488.

Relative hardening powers of various quenchants in the critical temperature ranges. Table, graphs. (J2)

191-J. Influence of Heat Treatment on the Properties of Drawn Steel Wire. Hermann Weil. *Wire and Wire Products,* v. 28, Aug. 1953, p. 788-790, 819-827.

Translated by Jerome W. Howe from Nov. and Dec. issues of *Draht-Welt.* Tables, graphs, micrographs. (J general, CN, S1)

192-J. (Dutch.) **The Hardness and Toughness of Steels as Functions of the Hardening and Tempering Temperature.** F. H. Willeumier. *Metalen,* v. 8, no. 12, June 1953, p. 251-255.

Effects of hardening temperature and C content on the relationship between the toughness and hardness of various steels. Tables, graphs. 5 ref. (Concluded.) (J26, J29, Q29, Q23, ST)

193-J. (French.) **The Various Industrial Phenomena of Steel Hardening.** A. Portevin. *Metalen,* v. 8, no. 12, June 1953, p. 247-250.

Mechanism of austenite-martensite transformation and the effects of various alloying elements on the hardening of steel. Graphs. (To be continued.) (J26, N8, AY)

194-J. (Book—French.) **(Heat Treatment Practice for Industrial Metals.) La Pratique des Traitements Thermiques des Metaux Industriels. Ed. 4.** Gerard de Smet. 405 p. 1953. Dunod, Paris.

Discusses heat treatment of both ferrous and nonferrous metals. (J general)

195-J. How Natural Gas Helps Make the Tools That Drill for More Natural Gas. Arthur Q. Smith. *Industrial Gas,* v. 32, Aug. 1953, p. 3-5, 26.

Gas-fired heat treating equipment for producing drill bits. Photographs. (J general)

196-J. Continuous Short-Cycle Anneal for Spheroidization of Cartridge-Case Steel. O. E. Cullen. *Metal Progress,* v. 64, July 1953, p. 79-82.

Proper annealing treatment to develop suitable microstructure. Micrographs, diagrams. (J23, CN)

197-J. Jet Principle Blasts Annealing Troubles. W. K. Lombard.

Steel, v. 133, Aug. 24, 1953, p. 80-81.
New high-velocity burner which steps up circulation in the furnace without mechanical means. Diagrams, photographs. (J23)

198-J. Gear Steels. Heat Treating Gives Them Life. John Obrebski. *Steel,* v. 133, Aug. 31, 1953, p. 94-96.
Carburizing and heat treating to improve wear resistance. Photographs, diagram. (J28, Q9, CN, AY)

199-J. Pack Carburizing Aspects and Developments. John E. Hyler. *Steel Processing,* v. 39, Aug. 1953, p. 386-389.
Use of cylindrical pots or boxes. Photographs. (J28)

200-J. Restoration of Ductility in Alloy Titanium Welds. A. J. Rosenberg, E. F. Hutchinson, and S. Weiss. *Welding Journal,* v. 32, Aug. 1953, p. 708-714.
Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Unique heat treating processes. Graphs, micrographs. (J general, K1, Ti)

201-J. (French.) Surface Hardening of Machine-Tool Slides. E. Blanpain. *Soudure et Techniques Connexes,* v. 7, nos. 1-2, Jan.-Feb. 1953, p. 46-49.
Experimental study on flame hardening techniques. Photographs, graph. (J2, CI)

202-J. One Setup Heat Treats Wide Variety of Work. S. W. Chantler and F. C. Schaefer. *Iron Age,* v. 172, Sept. 24, 1953, p. 131-134.
Single installation designed for three categories of work which heat treats nuts and fasteners of many shapes, sizes, and materials. Photographs, diagram. (J general)

203-J. How Heat Treatment Affects Properties of Cold Worked 18-8 Wire. Samuel Storcheim. *Iron Age,* v. 172, Oct. 1, 1953, p. 112-114.
Changes of mechanical and physical properties. Tables, charts. (J general, Q general, P general, SS)

204-J. Carbon Steel Can Replace Alloy for Small Diameter Bolts. A. S. Jameson, J. A. Halgren, and R. H. Pinkel. *Iron Age,* v. 172, Sept. 17, 1953, p. 153-156.
Importance of hardenability in selection of lean alloy or carbon steel to replace more highly alloyed steels. Graphs, tables. (J26, CN)

205-J. Age Softening of Beta Brass. Harry Green and Norman Brown. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1240-1244.
Effect of quenching temperature and of aging temperature and time on compression stress-strain curves of beta-brass was investigated. Graphs. (J26, Q28, Cu)

206-J. Titanium. The New Light Metal. *Light Metals,* v. 16, Sept. 1953, p. 308-309.
Surface hardening and electroplating of Ti. Graph. (Concluded.) (J28, L17, Ti)

207-J. A Test for Measuring Quench Crack Sensitivity of Engineering Alloy Steels. R. D. Chapman and Walter E. Jominy. *Metal Progress,* v. 64, Sept. 1953, p. 67-72.
Effect of quenching temperature and conditions, steel composition, and other factors on tendency to "crackability" specimen. Diagrams, table, graphs, photographs. (J26, AY)

208-J. Hard Strong Ti-Fe Alloys. H. W. Worner. *Metal Progress,* v. 64, Sept. 1953, p. 128, 130, 132.
Previously abstracted from "Heat Treatment of Titanium-Rich Titanium-Iron Alloys", *Institute of Metals, Journal.* See item 55-J, 1952. (J26, J27, Ti)

209-J. Oxiding. A Method of Hardening Metal. J. L. Meijering. *Metal Progress,* v. 64, Sept. 1953, p. 182, 184, 186.
Previously abstracted from "Hardening of Metals", *Philips Technical Review.* See item 78-J, 1953. (J26)

210-J. Automatic Heat Treatment of Crankshafts in Hagan Automatic Units. C. H. Schwerin. *Metal Treating,* v. 4, July-Aug. 1953, p. 2-3.
Automatic equipment and operation cycles. Photographs. (J general)

211-J. Large Rotary Hearth Furnace. Horace C. Knerr. *Metal Treating,* v. 4, July-Aug. 1953, p. 4-5.
Describes construction. Photographs, diagrams. (J general)

212-J. The Importance of Heat Treatment in the Manufacture of Oil Well Sucker Rods. G. H. Dickinson. *Metal Treating,* v. 4, July-Aug. 1953, p. 8-9, 34.
(J general)

213-J. How Boron Enhances the Hardenability of Steel. Thomas G. Digges. *SAE Journal,* v. 61, Sept. 1953, p. 24-28.
Excerpts from paper presented at SAE Annual Meeting, Detroit, May 18, 1953. Reviews previous work and gives facts known about action of B in steel. Graphs. (J26, AY)

214-J. Pack Carburizing Aspects and Developments. III. John E. Hyler. *Steel Processing,* v. 39, Sept. 1953, p. 459-462, 475.

Advantages of pusher-type furnace, temperature and time control, varying rate of carburization, localized carburization, and inhibiting Cu migration. Photographs. (J28)

215-J. In-Plant Heat Treating Saves $3000 Per Year. R. W. Blasser. *Steel Processing,* v. 39, Sept. 1953, p. 465-469.

In-plant vs. outside processing, gas vs. electricity, and flexible equipment. Photographs, tables. (J general)

216-J. Dual Heat Treat Set-Up for Aircraft Fasteners. Charles Palmer. *Western Metals,* v. 11, Sept. 1953, p. 59-61.

Fast flow of production gives clean, bright, decarb-free parts. Unit has controlled atmosphere hardening and tempering. Photographs, diagram. (J26, J29)

217-J. Electric Furnaces for the Wire Industry. Ernst von Kannen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 887, 928.

Exact temperature control needed in heat treatment of wire. Photographs. (J general, CN)

218-J. Molten Salts for the Wire Industry. F. R. Morral and F. A. Schaufelberger. *Wire and Wire Products,* v. 28, Sept. 1953, p. 889-893, 921, 923.

Usefulness, versatility and ease of control of molten salts in heat treatment of metals. Tables, graphs. (J2, CN)

219-J. (Dutch.) **Controlled Atmosphere for Steel With Adjustable Carbon Potential.** J. W. Holleman, W. A. Holleman, W. A. Schultze, and M. A. De Jongh. *Metalen,* v. 8, no. 14, July 31, 1953, p. 279-282.

Experimental installation based on thermal cracking of coal gas. Diagrams, graphs, microphotograph. 8 ref. (J2, ST)

220-J. (French.) **The Effect of Working Conditions and of Heat Treatment Upon the Properties of Heat-Resistant Light Alloys.** R. Syre. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 301-310.

Pilot-plant investigations. Effects of casting, homogenization, and tempering. Tables, photographs. 7 ref. (J general, Q general, EG-a)

221-J. (German.) **Hardening Temperature for Hardness Testing of Case-Hardened Steel.** Heinz Kiessler. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1116-1117.

Double vs. single hardening temperatures. Graphs, tables. (J26, Q29, ST)

222-J. (German.) **The Annealing of Seams for Arc-Welded Vessels.** F. Gentner. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 211-216.

Mechanical properties of unannealed, stress relieved, heat treated, and air-hardened arc welds. Comparative tests with basic bessemer steel. Tables, graphs. (J23, K9, Q general, ST)

223-J. (German.) **Experience With Oxy-Acetylene Stress-Relieving of Pressure Vessels.** Hans Kunz. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 216-225.

Measuring and relieving of residual stresses. Photographs, diagrams, graphs. 18 ref. (J1, ST)

224-J. (Spanish.) **To What Extent Does Stress Relief Take Place at Temperatures Between 200 and 300° C?** Rudolf Gunnert. *Ciencia y Técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 12 p.

Ratios between stresses and elastic limits of welded specimens were investigated under various heating conditions. Diagrams, photographs. 6 ref. (J1, K9)

225-J. Induction Furnaces for High Temperature. Frank T. Chesnut. *Industrial Heating,* v. 20, Sept. 1953, p. 1690, 1692, 1694, 1696, 1698.

Design and use of graphite induction furnaces capable of maintaining temperatures of 1500° C to 3600° C. Applications are for carbide processing, hot pressing and sintering, production of Mg. Diagrams, photographs. (J2, C21, H14, H15)

226-J. Nitriding of Titanium With Ammonia. James L. Wyatt and Nicholas J. Grant. *American Society for Metals, Preprint no.* 3, 1953, 26 p.

Surface hardening techniques applicable to Ti made to decrease wear and eliminate galling and seizing in commercial material and in Ti alloys. Diagram, graphs, micrographs. 7 ref. (J28, Ti)

227-J. Heat Treatment of High Strength, Titanium-Base Alloys. W. M. Parris, P. D. Frost, and J. H. Jackson. *American Society for Metals, Preprint no.* 4, 1953, 19 p.

Properties of heat treated Ti alloys were found to depend upon composition, type of heat treatment and fabrication history. Table, graphs, micrographs. 9 ref. (J general, Q general, Ti)

228-J. The Carbo-Nitriding of Boron Steels. G. W. Powell, M. B. Bever, and C. F. Floe. *American Society for Metals, Preprint no.* 23, 1953, 13 p.

Effect of B on hardenability. Tables, graphs, micrographs. 14 ref. (J28, CN, AY)

229-J. The Effect of Silicon on the Kinetics of Tempering. Walter S.

Owen. *American Society for Metals, Preprint no.* 24, 1953, 17 p.

Effects of three stages of tempering were separated and analyzed by means of the precision length measurement technique. Tables, graphs, micrographs. 15 ref. (J29, AY)

230-J. Another Look at Quenchants, Cooling Rates and Hardenability. D. J. Carney. *American Society for Metals, Preprint no.* 5W, 1953, 43 p.

Correlation of cooling rates and hardness in rounds and end-quench bars of low-alloy steels. Tables, graphs, micrographs. 14 ref. (J26, J2, AY)

231-J. Thermal Reproducibility of the End-Quench Test. John Birtalan, R. G. Henley, Jr., and A. L. Christenson. *American Society for Metals, Preprint no.* 6W, 1953, 20 p.

Effects of water pressure, temperature, bar scale condition and transfer time from furnace to quenching fixture. Graphs, photographs. (J26, CN)

232-J. Analysis of Hardenability Under Marquenching Conditions. Carl M. Carman, Dominick F. Armiento, and Harold Markus. *American Society for Metals, Preprint no.* 7W, 1953, 21 p.

Development of a Jominy-type hardenability test using molten salt at 400° F. as quenching medium. Hardenability of 11 commercial heat treatable steels determined. Tables, graphs, micrographs, diagrams. 11 ref. (J26, ST)

233-J. Heat Treatment of Tool Steels. J. G. Ritchie. *Australasian Engineer,* 1953, Feb., p. 73-80; disc., p. 80-81.

Metallurgical principles, water and oil hardening series, high speed hot work series, annealing and tempering. Tables, graphs. 4 ref. (J general, TS)

234-J. The Influence of Gaseous Atmospheres Containing Hydrogen on the Annealing of Malleable Cast Iron. S. W. Palmer. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 26-37.

Influence of H_2 on rate of heating and graphitization of blackheart malleable. Micrographs, graphs, tables. (J23, CI)

235-J. Second-Stage Malleablization. Floyd Brown. *Foundry,* v. 81, Oct. 1953, p. 108-109, 203, 205-207.

Direct and indirect transformation mechanism in determining most economical conditions for 2nd stage malleablization. Diagrams, tables. 3 ref. (J23, CI)

236-J. Heat-Treatment of Metal and Its Fire Hazards. R. W. Oxenbury. *Foundry Trade Journal,* v. 95, Sept. 24, 1953, p. 399-400.

Fire and explosion hazards of quenching tanks, oil storage, and salt baths. (J2, A7)

237-J. Induction Heating Generators as Production Tools in Heat Treating Operations. Peter A. Hassell. *Institute of Radio Engineers, Transactions, Professional Group on Industrial Electronics,* PGIE-1, Aug. 1953, p. 11-15.

Principles and development of equipment, typical installations and applications. Photographs, diagrams. (J2)

238-J. Stainless Steel Wire. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 25, Sept. 26, 1953, p. 82-83.

Softening treatment, high temperature annealing, and avoiding brittleness. (J29, J23, SS)

239-J. Surface Hardening of Steels and Irons. John L. Everhart. *Materials & Methods,* v. 38, Oct. 1953, p. 137-152.

Carburizing, nitriding, cyaniding and carbonitriding, and flame and induction hardening. Photographs, tables. (J28, J2, Fe)

240-J. Batch Heat Treating Is Versatile. Frank Crahen. *Steel,* v. 133, Sept. 28, 1953, p. 86-87.

Equipment and handling techniques. Photographs, table. (J general, CN)

241-J. (Dutch.) **Controlled Atmosphere for Steel With Adjustable Carbon Potential.** J. W. Holleman, W. A. Schultze, and M. A. DeJongh. *Metalen,* v. 8, no. 13, July 15, 1953, p. 263-266.

Methods for generating atmospheres with emphasis on quick adjustment of the C content of the protecting gas. Outline of an installation of simple construction. Diagrams, tables. (J2, ST)

242-J. How to Stop Pipe Weld Failure. *Chemical Engineering,* v. 60, Nov. 1953, p. 214.

Use of induction heating to stop stress failure of alloy and stainless steel pipe welds. (J2)

243-J. Automatic Gas Equipment is the Keynote for This Modern Heat Treating Plant. S. Clifton Pruett. *Industrial Gas,* v. 32, Oct. 1953, p. 3-6.

Equipment, plant layout and procedures including martempering, austempering, annealing, hardening, carburizing and normalizing. (J general)

244-J. Low Temperature Stress Relieving of Mild Steel Welded Structures. L. E. Benson and S. J. Watson. *Institute of Welding, Transactions,* v. 16, Aug. 1953, p. 90-95.

Experiments designed so that a quantitative estimate could be made of efficiency of stress relieving treatments at temperatures below 600° C., and particularly in region of 200-300° C. Tables, graphs, photographs, diagrams. 4 ref. (J1, ST)

245-J. Cast Refractories Lower Heat Treat Furnace Costs. T. F. Keegan. *Iron Age,* v. 172, Oct. 22, 1953, p. 113-115.

Advantages of cast refractories over conventional types after eight months operating experience at Lansing Drop Forge Co. Photographs. (J general)

246-J. Hot Face Insulation. *Iron & Steel,* v. 26, Oct. 1953, p. 468-470.

Operating advantages of its use in large annealing furnaces. Tables, diagrams. (J23)

247-J. The Bright Annealing of Copper and Its Alloys. W. C. F. Hessenberg and E. C. Mantle. *Metal Industry,* v. 83, Oct. 2, 1953, p. 279-281.

Oxygen-free atmospheres used in heat treating copper to reduce or eliminate oxide scaling. Diagrams, photographs. 6 ref. (To be continued) (J23, Cu)

248-J. Short Cycle Hardening of Tool Steels. J. Y. Riedel. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 2-3, 26.

Process of high speed steel hardening heat treatment operations, involving heating to unusually high temperatures for a short time. Includes hardness data, tables and photographs. (J26, TS)

249-J. Flame Hardening and Its Application to Meehanite Metal With an Improved Torch Design. Ron Ekins. *Metal Treating,* v. 4, Sept.-Oct. p. 4-5.

Conventional and new improved orifices in tips for flame-hardening equipment. (J2, CI)

250-J. Pusher Type Furnaces. E. W. Weaver. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 6-8.

Equipment, methods of work loading and advantages of pusher design. Photographs. (J general)

251-J. Roller Hearth Furnaces. C. O. Knierim. *Metal Treating,* v. 4, Sept.-Oct. 1953, p. 9-10.

Recent developments, general design and applications. Photographs. (J general)

252-J. The Problems of Furnace Control. II. Leo Walter. *Steel Processing,* v. 34, Oct. 1953, p. 521-525.

Automatic controls for heat treating furnaces. Diagrams. (J general, S16)

253-J. (French.) **Nitriding of Certain Nickel-Cobalt Alloys Near Their Curie Point.** Georges Nury. *Comptes rendus,* v. 237, no. 13, Sept. 28, 1953, p. 654-656.

Experiments were made between 300 and 600° C. on alloys containing 8, 9, 10 and 12% cobalt. Hardness-temperature curves plotted. Graphs. (J28, Ni, Co)

254-J. (German.) **Prospects of Oxy-Acetylene Low-Temperature Stress Relieving of Welds of Boilers and Pressure Vessels.** W. Mielentz. *Schweissen und Schneiden,* v. 5, no. 7, July, 1953, p. 268-269.

Three methods of treatment, evaluated technologically, metallurgically, and economically. 7 ref. (J1)

255-J. (German.) **Industrial Quenching of Basic Converter Steel From Rolling Heat.** Franz Kösters. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1342-1348.

Design and operation of a device for hardening round and structural steel up to 12 m. long. Effect on mechanical properties. Tables, diagrams, graphs. 12 ref. (J26, Q general, AY)

256-J. (Russian.) **Welding of Chromium Steels.** L. E. Fedotov. *Avtogennoe Delo,* v. 24, no. 6, June 1953, p. 21.

Annealing of welded seams. 8 ref. (J23, K general, AY)

257-J. (Russian.) **Electric Hardening of Tool Bits.** L. Ia. Popilov. *Stanki i Instrument,* v. 24, no. 5, May 1953, p. 17-19.

Apparatus and process. Results of processing carbon and high speed steel tools. Tables. (J26, TS)

258-J. Oxy-Acetylene Flame Hardening. *Canadian Metals,* v. 16, Oct. 1953, p. 40, 42, 44.

Process which consists essentially of raising metal locally above its transition temperature and quenching rapidly. Photographs, diagram, graph. (J2)

259-J. Electric Annealing of White Iron. Richard W. Parsons. *Foundry,* v. 81, Nov. 1953, p. 112-115.

Improved annealing techniques for cast iron, resulting in superior mechanical properties. Graphs, photographs. (J23, Q general, CI)

260-J. Heat Treatment of Steel Castings. II. John Howe Hall. *Foundry,* v. 81, Nov. 1953, p. 124-127, 242, 244, 246, 248.

Effects of ferrite and pearlite on cast steels containing 0.18 to 0.20% carbon and effects of time-temperature relationships on structure and properties. Photographs, diagrams, graphs. 2 ref. (To be concluded.) (J general, CI)

261-J. Heat Treating Facilities Provide Versatility, Rigid Control. W. G.

Patton. *Iron Age,* v. 172, Oct. 29, 1953, p. 106-108.

Equipment and techniques adaptable to variety of parts and processes. Photographs. (J general)

262-J. High Speed Continuous Annealing of Tinplate. M. D. Stone and E. A. Randich. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 69-75; disc., p. 75-78.

Plant layout, equipment and operating procedures. Diagram, photographs. 7 ref. (J23, Sn, ST)

263-J. The Bright Annealing of Copper and Its Alloys. W. C. F. Hessenberg and E. C. Mantle. *Metal Industry,* v. 83, Oct. 9, 1953, p. 301-303.

Use of various artificial atmospheres. Photographs. 7 ref. (To be continued.) (J23, Cu)

264-J. Flame Hardening Machines Speed Treatment of Engine Components. Arthur H. Allen. *Metal Progress,* v. 64, Oct. 1953, p. 97-102.

Mechanization of flame hardening process has resulted in accurate control, efficiency and ease of equipment maintenance. Photographs. (J2)

265-J. A Signaller to Reduce Quench Cracking of Steel. L. D. Jaffe, D. C. Buffum, and I. L. Preble. *Metal Progress,* v. 64, Oct. 1953, p. 119-121.

Design and use. Photographs, diagram, tables. (J26, AY)

266-J. Water in Molten Salt Increases Quenching Power, Lowers Operating Temperature. E. N. Case and A. M. White. *Metal Progress,* v. 64, Oct. 1953, p. 122-124.

Characteristics of KNO_3, $NaNO_3$, $NaNO_2$, H_2O system and possible applications. (J2)

267-J. Surface Treatment of Titanium. *Steel,* v. 133, Nov. 2, 1953, p. 130-132.

Summary of symposium sponsored by Watertown Arsenal at Armour Research Foundation. Hard surfaces produced by nitriding, carburizing, carbonitriding and induction heating. Silicon coating affords protection against oxidation. Photographs, graphs, table, diagrams. (J28, J2, L15, Si, Ti)

268-J. (Russian.) **Application of an Air Cooling Machine for Metal Tempering.** L. Rozenfel'd and N. Koshkin. *Kholodil'naia Tekhnika,* 1953, no. 2, Apr.-June, p. 15-19.

Obtaining of temperatures down to −110° C. Table, graphs, photograph, diagram. (J29)

269-J. (Russian.) **Phase Stresses Arising During Cementation of High-Carbon Steel.** V. V. Abramov. *Vestnik Mashinostroeniia,* v. 33, no. 6, June 1953, p. 70-71.

Shows that carburizing does not lead to additional deformations. Diagrams, graphs. (J28, CN)

270-J. (Swedish.) **Cementite Formation in Mild Steel and Sponge Iron on Gas Carburizing.** T. Norén and U. Landergren. *Jernkontorets Annaler,* v. 137, no. 7, 1953, p. 209-216.

Formation at temperatures below A_1. Table, graph. 20 ref. (J28, CN, Fe)

271-J. (Swedish.) **Conditions for the Formation of Cementite During the Carburization of Nickel Steels.** A. Hultgren and M. Hillert. *Jernkontorets Annaler,* v. 137, no. 7, 1953, p. 217-223.

Cementite formation decreases with increased nickel content. Graph, micrographs. 4 ref. (J28, Ni, AY)

272-J. (Book.) **Elements of Heat Treatment.** George M. Enos and William E. Fontaine. 286 p. 1953. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $5.00.

An introduction to the subject showing how mechanical properties of metals and alloys may be altered to suit particular situations. Discusses annealing, hardening, tempering, and normalizing from the standpoint of specific jobs requiring given characteristics in metal. (J general)

273-J. (Book.) **Protective Atmospheres.** A. G. Hotchkiss and H. M. Webber. 1953. 341 p. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $7.00.

Survey of properties, applications, generation methods, and results of atmospheric gases. Includes a discussion of basic chemical reactions of gases used for furnace atmospheres, preventing or reducing oxides, preventing decarburization, carburizing, carbon restoration and nitriding, and instruments for analyzing, controlling, and measuring gases. (J2)

274-J. (Book—German.) **(The Hardenability of Steel.) Die Härtbarkeit des Stahls.** Heinrich Arend and Werner Neuhaus. 200 p. Verlag W. Girardet, Essen, Germany. 19.80 DM.

History and problems, physics of iron alloys, and transformation processes. Cites experimental data and results. Photographs, diagrams, tables. (J26)

SECTION K

JOINING

1-K. Ingenious Machines Weld Thin-Wall Stainless Tanks. Robert L. Brown. *American Machinist,* v. 96, Nov. 24, 1952, p. 125-128.

Procedures for welding oxidizer tanks from Type 410 stainless steel. Overlapping spot welds replace regular seam welds for pressure-tight joints. Diagrams and photographs of equipment. (K3, SS)

2-K. Flame-Fluxing Brazes High-Strength Assemblies. John Shinn. *American Machinist,* v. 96, Nov. 24, 1952, p. 132-133.

Use of brass rod and flux applied by flame to replace scarce silver solder at McCulloch Motors Corp., Los Angeles. Applied to joining of steel tubing for handlebars. Photographs. (K8, Cu, SG-f, ST)

3-K. Induction Brazing Can be Used for Copper and Copper-Alloy Parts. E. M. Laughner. *American Machinist,* v. 96, Nov. 24, 1952, p. 138-140.

Examples and conditions governing application of induction heating for assembly of Cu parts. (K8, Cu)

4-K. Prefabricated Steel Vessels for Inland Waters. T. A. McLaren. *Engineering Journal,* v. 35, Nov. 1952, p. 1180-1184.

How welding has made possible substantial savings in shipment and on-site assembly costs. Diagrams. (K general, T22, CN)

5-K. Spot Welding in the Construction of the "Comet". C. A. Burton. *Welding and Metal Fabrication,* v. 20, Nov. 1952, p. 384-388.

Procedure adopted in material preparation (material precleaning operation, use of paste-etch cleaning, and subassembly of components prior to spot welding), welding, and subsequent inspection under laboratory control. High-strength Al alloys are used. (K3, L12, Al)

6-K. Maintenance of Civil Engineering Plant. *Welding and Metal Fabrication,* v. 20, Nov. 1952, p. 389-392.

The central depot of John Laing & Son, Ltd., Elstree, England, for repair and maintenance of company's civil-engineering equipment which involves a considerable amount of welded fabrication. Photographs show machinery and examples of work done. (K general, T4, CN)

7-K. Argonarc Welding Aluminium Brewery Plant. F. J. Stiles and J. F. Lancaster. *Welding and Metal Fabrication,* v. 20, Nov. 1952, p. 393-395.

Fabrication of brewery fermenting vessels from pure Al. Size and construction prevented oxyacetylene welding. Advantages and disadvantages of using argon-arc welding. (K1, Al)

8-K. Combined Welding and Forming Lower Appliance Costs. John Maloney. *Steel,* v. 131, Nov. 24, 1952, p. 104, 106.

A machine that performs both operations, requiring only one operator and affording savings in floor-area requirements. It is used in production of a variety of appliance cabinets and liners. (K3, G6, ST)

9-K. What's Ahead the Next Ten Years in Joining and Assembly. *American Machinist,* v. 96, Mid-Nov. 1952, p. F-F9.

Staking and doweling; gas, arc, inert-gas-shielded, resistance, pressure, and cold welding; soft soldering; and Cu and Ag brazing. Bolts and screws, adhesives, and assembling machines and conveyors. (K general)

10-K. Continuous Inert Arc Welding. *Canadian Metals,* v. 15, Nov. 1952, p. 45-46.

Inert-arc welding and its applications, including a semi-automatic process allowing continuous production of fine gage welds. (K1)

11-K. Welding in the Electrical Industry. J. Heuschkel. *Electrical Engineering,* v. 71, Dec. 1952, p. 1095-1100.

Welding in terms of its historical perspective, various processes, various ferrous and nonferrous materials, research, educational aspects, and future prospects. (K general)

12-K. Investigation of Thermal Processes in Spot Welding by Means of Models. D. S. Balkovetz. *Engineers' Digest,* v. 13, Nov. 1952, p. 374-376.

Previously abstracted from original in *Avtogennoe Delo,* see item 491-K, 1952. (K3, ST, Al)

13-K. Welding in the Soviet Union. J. Mannin. *Engineers' Digest,* v. 13, Oct. 1952, p. 351-356; Nov. 1952, p. 387-392.

Compares present techniques with those used in U. S. Includes survey of automatic arc welding under granulated flux. Diagrams and tables. (K general)

14-K. Ferrous Rod for Welding Nodular-Graphite Cast Iron. R. V. Riley and J. Dodd. *Foundry Trade Journal,* v. 93, Nov. 13, 1952, p. 555-560.

Experimental welds were made by oxyacetylene and electric arc to determine welding properties of nodular-graphite cast iron. Electric arc welding caused formation of hard carbide flash at base metal-weld metal junction. Gas welding with proprietary cast iron welding rods yielded a weld of low physical properties due to presence of flake graphite. A new welding rod was developed for gas welding which yielded a nodular-graphite cast iron weld deposit. (K1, K2, CI)

15-K. Joining Copper Tube and Soldered Fittings. Doremus L. Mills. *Heating and Ventilating,* v. 49, Dec. 1952, p. 105-106.

Procedure for proper making of soft soldered joints between Cu tube and fittings that are strong enough to withstand stresses that might occur in most domestic piping systems. Illustrations demonstrate seven steps employed in this method. (K7, Cu)

16-K. Welded Industrial Structures for Economy and Efficiency. Van Rensselaer P. Saxe, *Industry & Welding,* v. 25, Dec. 1952, p. 39-42.

Advantages and savings possible by using welding in building construction. Photographs and diagrams. (K general, T26, ST)

17-K. Importance of the Root Pass in Pipe Welding. M. W. Eddins. *Industry & Welding,* v. 25, Dec. 1952, p. 44-46, 47, 74-75.

Methods of producing good welds in steel pipe. Diagrams and photographs. (K general, ST)

18-K. Submerged Arc Welding Builds 1,000 Steel Shells. Donald F. Baumler. *Industry & Welding,* v. 25, Dec. 1952, p. 50-52, 83.

Quality production welding of 1,000 steel shells at Farrar & Trefts, Inc., Buffalo, N. Y., using automatic submerged-arc welding, coupled with company-developed welding techniques and rigid quality control. (K1, ST)

19-K. Low-Hydrogen Electrodes Used in Welding 1½"-5½" Plate. W. D. Warren. *Industry & Welding,* v. 25, Dec. 1952, p. 54, 87.

Techniques used in construction of large press frames at the Dominion Bridge Co., Ltd. (K1, ST)

20-K. Here's How to Weld 17% Chromium Stainless Steel. *Industry & Welding,* v. 25, Dec. 1952, p. 58-60, 62, 98-99.

Techniques and properties of welds made by different methods. Tables and photographs. (K general, SS)

21-K. Proper Procedure Eases Welding of Stainless Clad Steels. Part II. (Concluded) *Industry & Welding,* v. 25, Dec. 1952, p. 77-78, 80, 82.

Techniques for welding various gage sheets and plates; also for annealing and cleaning. (K general, J23, L12, SS)

22-K. Here's How Improved Brazing Methods Make Leak-Proof Refrigeration Units. A. L. Johnson. *Industry & Welding,* v. 25, Dec. 1952, p. 84, 86-87.

Techniques and new developments. Various combinations of metals are included. (K8, Cu, ST)

23-K. Oxy-Acetylene Welding of High Carbon Steel. *Industry & Welding,* v. 25, Dec. 1952, p. 120-121.

Ten points for insuring good welds of band saw blades. (K2, CN)

24-K. Making High Tensile Short-Link Steel Chain. W. Gibson Biggart. *Machinery* (London), v. 81, Nov. 14, 1952, p. 1034-1037.

Chain fabrication, including resistance buttwelding and flash buttwelding machines. Mechanical tests for chains. (K3, Q general, AY)

25-K. How to Fabricate 17 Percent Chromium Stainless Steel. Richard E. Paret. *Materials & Methods,* v. 36, Nov. 1952, p. 100-104.

Welding of Type 430 stainless steel. Weld ductility can be improved by reducing heat input during welding, by using 430-T, by annealing the welds, and by using a Cr-Ni welding electrode. Tables and illustrations. (K1, SS)

26-K. Welded and Brazed Parts. H. R. Clauser. *Materials & Methods,* v. 36, Nov. 1952, p. 123-138.

Manual on shapes, sizes, thicknesses that can be welded, weldable materials, properties and characteristics of welded joints, joint designs

and welds, cost considerations, and typical applications. (K general)

27-K. The Assembly of Aluminium Components by Welding. H. W. Keeble. *Metal Industry,* v. 81, Nov. 21, 1952, p. 401-403.

Features of unit assemblies involving fusion welding of sand cast and wrought Al alloys. Typical applications. (K general, Al)

28-K. Some Interesting Aluminium Alloy Castings. H. C. Cross. *Metal Industry,* v. 81, Nov. 21, 1952, p. 403.

Replacement of an iron casting by a gravity die-cast Al frame cast in two pieces and joined by arc welding. (K1, E13, Al)

29-K. The Story of Platte Pipe Line: Details of Design and Construction. Melvin M. Lee. *Oil and Gas Journal,* v. 51, Dec. 1, 1952, p. 109, 111.

Process of laying a 20-in. pipe line and problems encountered. Welding by electric shielded arc, X-ray inspection, coatings applied to pipe, cathodic protection, and testing to determine leaks in pipes. (K1, S13, L26, R10, CN)

30-K. Automatic Welding of Tool Joints Made Practical. *Oil and Gas Journal,* v. 51, Dec. 8, 1952, p. 110-111.

Welding procedure and equipment which eliminate porosity due to gases generated from "dope", and undercutting and cracking due to high welding currents. (K1)

31-K. Welding Repairs to a Large Casting for a Swing Dock Bridge. J. T. Williams. *Welder,* v. 21, July-Sept. 1952, p. 50-52.

The building up of a large hydraulic ram made of cast iron using "Cinex" Ni electrodes. Photographs. (K1, T26, CI, Ni)

32-K. A New Factory of the Portal Frame Type. S. J. Seabrook. *Welder,* v. 21, July-Sept. 1952, p. 53-56.

Welding procedures and fixtures used in construction of steel frame for factory. (K1, T26, ST)

33-K. Two Welded Labour-Saving Agricultural Machines. *Welder,* v. 21, July-Sept. 1952, p. 57-58.

Welding of steel parts was used extensively. Techniques. (K1, T3, ST)

34-K. A Small Welded Steel Frame Factory Building. D. D. Bamber. *Welder,* v. 21, July-Sept. 1952, p. 61-62.

Welding of steel trusses. (K1, T26, ST)

35-K. Saved: 341 Tons of Steel. II. R. A. Phelps. *Welding Engineer,* v. 37, Nov. 1952, p. 32-35; Dec. 1952, p. 56-59.

Erection procedure, including field welding, used for the V. A. Hospital building in Minneapolis. Tables, diagrams, and photographs. (K general, T26, CN)

36-K. Welding Is Crude on Russian Tanks. H. C. Phelps. *Welding Engineer,* v. 37, Dec. 1952, p. 50-51, 64.

Raises questions of overdesign in U. S. equipment. (K general)

37-K. Sparks Fly as Armored Bus Hulls Take Shape. *Welding Engineer,* v. 37, Dec. 1952, p. 52-53, 62.

How our military vehicles are joined at Consolidated Western Steel plant. (K1, ST)

38-K. How Would You Repair This Yankee Drier Roll? F. C. Zimmer. *Welding Engineer,* v. 37, Dec. 1952, p. 54-55.

Repair of a large cast-iron pulp drier with Mn-bronze filler rods. (K2, CI)

39-K. Seam Welding at 120,000 Amperes. *Welding Engineer,* v. 37, Dec. 1952, p. 60-62.

Mammoth welders at Ryan Aeronautical Co. make leakproof seams on the world's biggest Al fuel tanks for aircraft. (K3, Al)

40-K. Automatic Single and Multiple Hydraulic Riveting. Andrew E. Rylander. *Western Machinery and Steel World,* v. 43, Nov. 1952, p. 94-96.

How hydraulic riveters can be applied to full and semi-automatic riveting, using standard power units. Automatic cycling and details of operation. Diagrams. (K13, CN)

41-K. Alloy Eliminates Flux in Welding Aluminum. Samuel Freedman. *Western Metals,* v. 10, Nov. 1952, p. 44-46.

Chemalloy, which permits welding or soldering of Al without flux or special preparations. (K general, Al)

42-K. (French.) **The Process of Assembling Small Metallic Structures of Light Alloys.** René Léveillé. *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 362-363.

Method used for joining light alloys including welding, riveting, bolts and screws, and pressing. (K general, Al)

43-K. (German.) **A New Variation of Pressure Welding.** Leo Knez. *Schweisstechnik,* v. 6, Sept. 1952, p. 101-106.

Steel surfaces which are to be joined and which have been heated to 1000° C., are treated for a short time with a carburizing acetylene flame. Details of the process are diagramed. Micrographs, photographs. 15 ref. (K2, ST)

44-K. Novel Methods Arc Weld High-Strength Alloys. F. G. Harkins and H. C. Thompson. *American Machinist,* v. 96, Dec. 8, 1952, p. 118-124.

How welding problems on tough, heat resistant alloys have been overcome at Solar Aircraft by specially developed equipment and innovations in welding technique that give high-speed, high-quality weld-

ing without need for highly skilled operators. (K1, SS)

45-K. Welding's Fast Growth Beats General Industry Rate by 250%. T. J. Jefferson. *Industrial Marketing,* v. 37, Dec. 1952, p. 34, 36-37, 169-171.

Growth of welding techniques and expected future. (K general)

46-K. Braze-Welding Clinic. *Linde Tips and Oxy-Acetylene Tips,* v. 32, Jan. 1953, p. 8-9.

A series of photographs illustrating typical faulty brazing practices. Remedies. (K8)

47-K. Recommended Conditions for Spot Welding Some Combinations of Dissimilar Metals. *Machinery,* v. 59, Dec. 1952, p. 251.

Data sheet. (K3)

48-K. Ultrasonic Soldering in the Foundry. Light Alloy Casting and Pattern Repairs. *Metallurgia,* v. 46, Nov. 1952, p. 251-252.

Use for repairing faulty light alloy castings and Al patterns. (K7, Al)

49-K. Cutting and Welding Stainless Steel. *Petroleum,* v. 15, Dec. 1952, p. 331-332, 334.

Methods which enable heat, corrosion resistance, and other valuable properties of this metal to be more widely used. Ways in which welded joints should be finished. (K general, G22, SS)

50-K. Low-Hydrogen Welding Rods. J. D. Fast. *Philips Technical Review,* v. 14, Sept.-Oct. 1952, p. 96-101.

Basic electrodes designed to suppress the absorption of large quantities of hydrogen which generally results when the O_2 transmission is decreased. 11 ref. (K1)

51-K. Know Your Condenser Tube Joints. A. Levine. *Power Engineering,* v. 56, Dec. 1952, p. 66-67, 107-108, 111.

How to pack and maintain condenser tube joints, and how to remove tubes. Photographs and diagrams. (K general)

52-K. Redesign for Producibility Based on New Welding Technique. *Product Engineering,* v. 23, Dec. 1952, p. 174-180.

Technique for arc welding stainless steel parts to modified nodular cast iron as developed in redesign of center main bearing support for Wright Sapphire turbo-jet engine. Mechanical properties of welds are tabulated. (K1, Q general, CI, SS)

53-K. Stud-Welding Simplifies Rail-Relaying Job on Deck of Concrete Pier. *Railway Engineering and Maintenance,* v. 48, Dec. 1952, p. 1186-1187.

Project involving the reconditioning of pier facilities of Earle U. S. Naval Ammunition Depot at Leonardo, N. J., where it was found necessary to replace all existing railroad salvage on the piers. (K1, T23, CN)

54-K. Large Casting Repaired by Welding. *Railway Engineering and Maintenance,* v. 48, Dec. 1952, p. 1195.

Arc welding of a broken frame for boiler-plate rolling equipment. (K1, T23, CI)

55-K. Butt Welding Thin Stainless Steel. *Tool Engineer,* v. 29, Dec. 1952, p. 54.

A condenser discharge technique for spot welding butt joints of very thin stainless steel developed by Naval Ordnance Laboratory. (K3, SS)

56-K. (German.) **The Importance of Austenitic Fusion Welding in Chemical Engineering.** E. Klosse. *Chemie-Ingenieur-Technik,* v. 24, Nov. 1952, p. 615-617.

Importance and limitations for carbon and stainless steels. Micrographs and charts. (K2, CN, SS)

57-K. (Book.) **Electric Arc and Oxy-Acetylene Welding.** E. A. Atkins and A. G. Walker. 352 pages. Sir Isaac Pitman & Sons, Ltd., 39 Parker St., Kingsway, London W.C. 2, England. 30s.

Processes and techniques. Theory of welding, as well as the practical side. Useful background in welding procedures for students includes details of examinations, regulations and specifications, and specimen examination questions of the City and Guilds of London Institute. (K1, K2)

58-K. (Book.) **The Joining of Metals.** 174 pages. 1952. The Institution of Metallurgists, 4 Grosvenor Gardens, London, S.W. 1, England.

Limited to certain aspects of fusion welding of ferrous and nonferrous alloys, brazing, and soldering. (K general)

59-K. (Book.) **Weldability of Metals.** 141 pages. Lincoln Electric Co., 12818 Coit Rd., Cleveland 17, Ohio. 50 cents in U. S.; 75 cents elsewhere.

Prescribes best welding procedures for various ferrous and nonferrous metals. Tabular data, drawings, and pictures. (K general)

60-K. (Book.) **Welded Highway Bridge Design.** J. G. Clark, editor. 240 pages. 1952. James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio. $2.00 in U. S.; $2.50 elsewhere.

Presents major features of designs submitted in award program for all-welded two-lane highway bridges. Covers structural types, floor systems, new sections, connections, quantities, and costs. (K general, T26, ST)

61-K. Resistance Welding of Aircraft Structures. John Starr. *Aero Digest,* v. 65, Dec. 1952, p. 50, 52, 54, 56, 58.

Development of welding in aircraft industry. Compares results with those of riveted construction. (K3)

62-K. Fumes and Gases in Arc Welding. Erik Thrysin, Gideon Gerhardsson, and Sven Forssman. *A. M. A. Archives of Industrial Hygiene and Occupational Medicine,* v. 6, Nov. 1952, p. 381-403.

Tests were made on composition of gases and fumes produced by manual arc welding with electrodes intended for joining mild steel, stainless steel, cast iron, bronze, and Monel metal. Test apparatus and procedure for taking samples. Tables and photographs.
(K1, SS, CI, Fe, Cu, Ni)

63-K. Railway Engineering. Part II. Improved Running Conditions: Use of Welding for Long Lengths of Rail: Development of Prestressed Concrete Techniques. Rolt Hammond. *Overseas Engineer,* v. 26, Dec. 1952, p. 178-179.

Details of techniques. Photographs and diagrams.
(K general, T23, ST)

64-K. An Investigation Into the Criteria of Weldability of Low-Carbon Steel Sheets. H. C. Goosens and C. Vollers. *Sheet Metal Industries,* v. 29, Nov. 1952, p. 1097-1113.

Investigation by the Research Committee of the Netherlands Welding Society to ascertain what method was most suitable for the determination of the weldability of steel sheets. Diagrams, micrographs, tables, photographs, and graphs.
(K9, CN)

65-K. Ingenious Repair by Welding. *Transactions of the Institute of Welding,* v. 15, Oct. 1952, p. 131-132.

Repair job on cast iron wheel.
(K general, CI)

66-K. Industrial Brazing: Induction Brazing. E. V. Beatson and H. R. Brooker. *Welding and Metal Fabrication,* v. 20, Nov. 1952, p. 406-410; Dec. 1952, p. 439-442.

Various methods and materials used in the process. Photographs and diagrams. (K8)

67-K. The A. C. Welding Arc. L. H. Orton, J. C. Needham. *Welding and Metal Fabrication,* v. 20, Dec. 1952, p. 451-452, 453-454.

Effects of alternating current arc re-ignition characteristics and influence of short-time characteristics of welding circuit on arc maintenance. (K1)

68-K. Inert-Gas Shielding of the Metallic Arc. William L. Green and Robert J. Krieger. *Welding Journal,* v. 31, Dec. 1952, p. 582s-586s.

Investigation conducted to study burn-off rates and spatter losses accompanying the shielding of the arc of $\frac{5}{32}$ x 14-in. carbon steel electrode (polished core wire) with inert gases. Two types of metal transfer in the inert-gas-shielded consumable-electrode arc were observed on high-speed motion pictures. Graphs. (K1, CN)

69-K. Failures and Defects Encountered in the Construction of Welded Ships. R. D. Bradway. *Welding Journal,* v. 31, Dec. 1952, p. 1111-1121.

Different types of cracks are classified as to origin and cause with special emphasis on welding procedures, fabrication, workmanship, design and materials. Diagrams.
(K9)

70-K. Fusion Welding Techniques for Jet Aircraft Components. Arnold S. Rose and Morton A. Braun. *Welding Journal,* V. 31, Dec., 1952, p. 1121-1128.

Welding processes under discussion include inert-gas shielded-arc, shielded-inert-gas metal-arc, and submerged arc as applied to stainless steels, high-temperature alloys, low-carbon steels and low-carbon, low-alloy steels. Tables and micrographs. (K1, SS, AY, CN)

71-K. How to Save Cost by Designing for Structural Welding. Alfred E. Pearson. *Welding Journal,* v. 31, Dec. 1952, p. 1129-1135.

Factors affecting cost of a number of welded connections frequently used for welded structures. Diagrams. (K general, T26)

72-K. Surface Alloying in Brazing and Related Techniques. Dr. Robert Humphrey and Rene D. Wasserman. *Welding Journal,* v. 31, Dec. 1952, p. 1135-1140.

A general discussion. Graphs and photographs. (K8)

73-K. Magnetic Force Welding. Myron Zuker and Guy Cubitt-Smith. *Welding Journal,* v. 31, Dec. 1952, p. 1141-1153.

Machine which uses the magnetic force of the welding current to produce rapidly rising pressure on the work. Pressure is adjustable in magnitude and synchronized with the welding current. Results of tests on Cu, Ag, W, Al, and steel. Photographs and charts.
(K3, Cu, Ag, W, Al, CN)

74-K. Experiments on Brittle Fracture of Steel Resulting From Residual

Welding Stresses. R. Weck. *Welding Research,* v. 6, Aug. 1952, p. 70r-82r.
Results of tests on ¾-in. carbon and low-alloy steel plates welded so as to produce high residual stresses. Photographs, micrographs, and charts. (K9, CN, AY)

75-K. Argon-Arc Welding of Copper. J. H. Cole. *Welding Research,* v.6, Aug., 1952, p. 83r-86r.
Reviews developments and observations at the British Welding Research Association laboratories. Data are tabulated. (K1, Cu)

76-K. C.T.S. Weldability Test for High-Tensile Structural Steels, Welded by the Metal-Arc Process. *Welding Research,* v. 6, Oct. 1952, p. 89r-92r.
Test developed by the British Welding Research Association, consisting of a series of fillet welds. Diagrams and tables. (K9, K1, ST)

77-K. Surface Cleaning of Some Aluminium Alloys Prior to Spot Welding. H. E. Dixon. *Welding Research,* v. 6, Oct. 1952, p. 93r-101r.
Results of research carried out by the British Welding Research Association. Data are tabulated and charted. (K3, L12, Al)

78-K. Target Fixtures Precision-Weld New Gun Pedestal. E. C. Pearson and Frank George. *American Machinist,* v. 97, Jan. 5, 1953, p. 114-117.
Precision-machined pieces are welded to unmachined pedestals at Watertown Arsenal. Target fixtures locate pieces precisely during welding so machined surfaces are in accurate relationship to surfaces machined in later operations. Process cuts layout time, reduces rework, and minimizes over-all production cycle. Photographs. (K1, G17)

79-K. Welding Tool Steels With the Auswelding Method. Tore Noren. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 412-419.
Repairing or refacing of toolsteels by heating base metal to proper austenitizing temperature then cooling to and welding at temperature where austenite decomposes most slowly. (K general, TS)

80-K. Welding Austenitic Steels for High-Pressure Boiler Plants. Egon Kauhausen. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 429-435.
Difficulties involved. A successful method of welding using the Argon-arc method was evolved after careful tests for microfissures, corrosion, embrittlement, etc.
(K1, AY, SS)

81-K. Hot Galvanized Steel Water Tanks Welded by Submerged Arc Technique. A. M. McIntyre. *Canadian Metals,* v. 15, Dec. 1952, p. 46, 48.
General discussion. (K1, CN)

82-K. Construction of a Tubular Steel Skip Bridge. *Engineer,* v. 194, Dec. 19, 1952, p. 831-832.
Welding manipulation problems encountered. (K1, T26, CN)

83-K. Welding of Malleable Castings. T. J. Palmer. *Foundry Trade Journal,* v. 93. Dec. 11, 1952, p. 667-672.
Process differences, metallurgical considerations, porosity, practical methods of joining, and bronze welding. Micrographs.
(K general, CI)

84-K. General Function of Coatings on Arc Welding Electrodes. David Rozet. *Industry & Welding,* v. 26, Jan. 1953, p. 33-34, 36, 62-63.
Composition, protection of weld metal, arc stability, cooling rate, and uniform metal flow. Tabulated information on chemical analyses of mild steel electrodes, basic coatings, and mechanical properties.
(K1, CN)

85-K. Glass Tape Backup Improves Quality of Root Welds. L. R. Constantine. *Industry & Welding,* v. 26, Jan. 1953, p. 41-42, 58, 60-62.
Advantages over gases or iron powder backup, particularly for stainless steel welding.
(K general, SS)

86-K. Combination Machine Forms and Welds in Automatic Operation. *Industry & Welding,* v. 26, Jan. 1953, p. 44-46.
Machine has automatic welding cycle, cuts production costs, and eliminates overforming. Photographs. (K1, G general)

87-K. Twin-Arc Welding. *Machinery* (Lloyd), v. 24, Dec. 1952, p. 105-106.
Advantages over single-phase welding. (K1)

88-K. Welding Stainless Steels. *Machinery* (Lloyd), v. 24, Dec. 1952, p. 120-121.
Problems and techniques.
(K general, SS)

89-K. Aluminum Honeycomb Sandwich Has Light Weight, High Strength, Good Stability, Uniform Density. Phillip O'Keefe. *Materials & Methods,* v. 36, Dec. 1952, p. 96-98.
Properties and fabrication of Al honeycomb. (K12, Al)

90-K. Brazing Vacuum-Tight Joints in High Nickel Alloys. Robert A. Wallace and William R. Vanderveer. *Materials & Methods,* v. 36, Dec. 1952, p. 117-118.
How Sylvania made several consecutive brazes on relatively large

parts to produce a clean, oxide-free, vacuum-tight assembly. (K8, Ni)

91-K. Technical Factors in Cold Welding Aluminum. W. E. McCullough. *Modern Metals,* v. 8, Dec. 1952, p. 40, 42, 44.

The 3-phase cycle of cold welding, method of testing the weld bond, and recent developments in Al-Al, Cu-Cu and Al-Cu joining. (K5, Al, Cu)

92-K. Welding Meets Jet-Engine Challenge. K. H. Koopman. *Steel,* v. 131, Dec. 29, 1952, p. 76-80.

Tungsten-arc, sigma, and submerged-arc welding. Lists base metal and logical choice of welding rod for joining dissimilar metal combinations. Photographs. (K1)

93-K. Lungs of Steel. *Steel Horizons,* v. 14, Year-End 1952, p.16-17.

Assembly and use of stainless steel nozzle boxes in aircraft. Six types of welding are used. (K general, T24, SS)

94-K. Big Joints Welded for Gas Turbines. *Welding Engineer,* v. 38, Jan. 1953, p. 23.

Automatic inert-gas welding of expansion joints of Type 321 stainless steel to standard carbon or low-alloy steel ends. (K1, SS, CN, AY)

95-K. New Technique for Brazing and Soldering of Aluminum. Thomas A. Dickinson. *Welding Engineer,* v. 38, Jan. 1953, p. 32-33.

Technique which is adaptable to brazing and soldering with variation in filler material, fluxes, and fusion temperatures. (K7, K8, Al)

96-K. Titanium to Tile, Aluminum to Titanium. Arthur L. Phillips. *Welding Engineer,* v. 38, Jan. 1953, p. 36-37.

Bonding agent which successfully joins materials of dissimilar properties. (K11, Ti, Al)

97-K. Billions in Sales, Millions in Savings. Julius Heuschkel. *Welding Engineer,* v. 38, Jan. 1953, p. 38-41.

Welding procedures in electrical industry. Processes, design and materials, education required, and future prospects. (K general)

98-K. How to Set Up a Program for Quality Control. Peter G. Poetto. *Welding Engineer,* v. 38, Jan. 1953, p. 44-46, 48.

Program set up at C B C Welding Corp. to reduce inefficiency of resistance welding Al and steel products. Cleaning procedure, control of solutions, machine maintenance, and check list. (K3, S12, Al, ST)

99-K. (German.) **Wedge Welding of Aluminum and Copper by Means of Selfwelding.** Wilhelm Hofmann, Hans-Jochen Husmann, and Rolf Koppe, *Zeitschrift für Metallkunde,* v. 43, Oct. 1952, p. 354-356.

Process in which Cu wedges are driven into Al at temperatures above 548° C. Tensile strength and electric conductivity of weld joints were determined. Advantages and possibilities of application. Diagrams, photographs. (K6, Q27, P15, Al, Cu)

100-K. The Training of Electric Welding Supervisors. R. B. Luttrell. *Australasian Engineer,* Nov. 7, 1952, p. 42-45.

Advantages of training, requirements for a welding supervisor, advantages of employing a supervisor, and meaning of the supervisory certificate. (K1, A6)

101-K. Nickel-Clad Steels Welded by Shielded Metal-Arc Process. Richard G. Lyall. *Iron Age,* v. 171, Jan. 15, 1953, p. 102-103.

Welding carbon steel or low-alloy high-strength steel clad with Ni. (K1, L22, CN, AY)

102-K. Factors Which Dictate the Design of Ferrous Welding Electrodes. D. L. Mathias. *Foote Prints,* v. 24, No. 2, 1952, p. 7-24.

Functions of electrode coating, phases of electrode formulation, chemical formulation, arc shielding, arc stability, arc energy, and factors affecting them; deoxidation and alloying; physical formulation; processing procedure; and coating materials. Graphs and photographs. (K1, T5, ST)

103-K. Joining Stampings. Federico Strasser. *Machine Design,* v. 25, Jan. 1953, p. 163-165.

Riveting and locking methods of designing economical joints for multiple piece stamping assemblies. Diagrams. (K13)

104-K. Welding Practice With Stainless Steel. Part II. Oxyacetylene; Inert-Gas Metal-Arc; Spot Welding. E. M. Rains. *Sheet Metal Worker,* v. 44, Jan. 1953, p. 86-87.

Brief description. Photographs. (K1, K2, SS)

105-K. Welded Plate Girders. F. Brooksbank. *Welding and Metal Fabrication,* v. 20, Oct. 1952, p. 363-366; Nov. 1952, p. 400-403; Dec. 1952, p. 448-450; v. 21, Jan. 1953, p. 30-34.

Design considerations of welded plate girders. Part II: Assembly procedure, distortion and contraction in welding, use of automatic welding, continuous plate girders, and design for a 30-ft. plate girder for use in building construction. Part III: Flanges. Part IV: Mathematical analysis. Diagrams and tables. (K1, T26, CN)

106-K. Metal Fabrication in the Owen Organization. *Welding and Metal Fabrication,* v. 21, Jan. 1953, p. 2-8.

Equipment and products with emphasis on welded steel components. Photographs. (K general, ST)

107-K. All-Welded Plate Girder Through-Type Bridge. *Welding and Metal Fabrication,* v. 21, Jan. 1953, p. 9-12.

Welding techniques, and fabrication of a British steel bridge. Photographs. (K1, T26, CN)

108-K. Fixtures and Positioners for Manual Arc Welding. Donald Ross. *Welding and Metal Fabrication,* v. 21, Jan. 1953, p. 17-20, 24.

Fixtures for cutting, preparation, setting up, tacking, putting down the weld, deslagging, fettling, and general cleaning of the weldment. (K1, CN)

109-K. (German.) **Pressure Welding of Metals.** Hummitzsch. *Schweisstechnik,* v. 6, Oct. 1952, p. 116-118.

Lap-joints can be made with Al, Sn, Cu, and steel if surfaces are clean. Speed of deformation has no effect at room temperature. 3 ref. (K2, Al, Sn, Cu, ST)

110-K. (Book.) **Lead Work for Modern Plumbing.** 164 pages. 1953. Lead Industries Association, 420 Lexington Ave., New York 17, N. Y. $1.50.

Lead working tools, how to do soldering with "irons," joint wiping, lead pipe bending, and yarning and calking cast-iron pipe joints, all given in step-by-step photographic sequence as well as explanatory text. (K7, Pb, CI)

111-K. (Book.) **Recommended Practice for the Welding of Steel Castings.** 38 pages. Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, Ohio. 35 cents.

Manual to serve as a guide in establishing practices which lead to sound, crack-free welds, welding of steel castings (cast-weld construction), and fabricating structures through welding of steel castings to wrought steel products (composite fabrication). (K general, CI)

112-K. Resistance Welding. *Aero Digest,* v. 66, Jan. 1953, p. 42.

Welding Al aircraft parts. (K3, Al)

113-K. Frequency Changer for Resistance Welding. M. E. Bivens. *Electronics,* v. 26, Feb. 1953, p. 108-114.

Direct conversion from 3-phase 60-cycle power to single-phase low-frequency power improves power factor and reduces kva demand and line drop, compared to more commonly used 60-cycle single-phase machines. Circuit diagrams. (K3)

114-K. Welded Jet Engine Parts Cut Weight, Increase Power. *Iron Age,* v. 171, Jan. 22, 1953, p. 110-112.

Extended abstract of "Shielded Arc Welding of Jet Engine Components", by K. H. Koopman presented at 33rd annual meeting of AWS. Tabulates information concerning composition, jet engine components, and recommended welding rod for wrought modified austenitic stainless steels, wrought specialized alloys, and cast special alloys. Combinations of dissimilar metals and recommended welding rods are given. (K1, AY, SS)

115-K. Experiments on the Properties and Uses of Heat-Resisting Ferritic-Austenitic Arc-Welding Electrodes. J. P. Kienberger. *Sheet Metal Industries,* v. 30, Jan. 1953, p. 23-43, 72.

Comprehensive discussion. Tables and graphs. 37 ref. (K1, T5, SS)

116-K. Spot Welding of Magnesium With Three-Phase Low Frequency Equipment. Paul Klain, D. L. Knight, and J. P. Thorne. *Welding Journal,* v. 32, Jan. 1953, p. 7-18.

Use of single or dual force system, with or without postheat. Tables, graphs, macrographs, and radiographs. (K3, Mg)

117-K. Inert Arc Welding of 90-10 Cupro-Nickel. Lowell H. Hawthorne. *Welding Journal,* v. 32, Jan. 1953, p. 31-36.

Development of filler metal and the welding procedures for producing sound, satisfactory welds in 90-10 Cu-Ni by gas-shielded inert-arc process. Tables and radiographs. (K1, Cu, Ni)

118-K. The Preheating and Postheating of Pressure Vessel Steels. Robert D. Stout. *Welding Journal,* v. 32, Jan. 1953, p. 14s-22s.

Soundness and mechanical properties of welds. Includes table containing recommended preheating and postheating temperatures for various C contents and thicknesses of grades of steel commonly used for pressure vessels. Graphs. (K general, CN)

119-K. Report on the Design of Pressure Vessel Heads. *Welding Journal,* v. 32, Jan. 1953, p. 31s-41s.

Interpretive report based largely on laboratory research and theoretical investigations sponsored by Design Division of Pressure Vessel Research Committee of the Welding Research Council. (K general, T26)

120-K. High-Current Tungsten Arc in Argon, Helium and Their Mixtures. Merrill Skolnik and T. B. Jones. *Welding Journal,* v. 32, Jan. 1953, p. 55s-64s.

Experimental results of preliminary exploration study of high-cur-

rent inert-gas arc welding. Tables and graphs. (K1, W)

121-K. Unionmelt Welding Applied to Steel Plant Maintenance. *Western Machinery and Steel World,* v. 44, Jan. 1953, p. 94-95.

How submerged-melt welding is accomplished, and the savings involved. (K1, ST)

122-K. (French.) **Electric Resistance Welding in Automobile Construction.** Ch. Moressee. *Revue Universelle des Mines, de la Metallurgie des Travaux Publics, des Sciences et des Arts Appliques a l'Industrie,* ser. 9, v. 8, Nov. 1952, p. 410-426.

The process, various phenomena encountered in operation, and evolution of technique of welding thin steel and light alloy plates. Micrographs, photographs, and diagrams. (K3, CN, Al, Mg)

123-K. (French.) **Evolution of Research on Weldability in French Naval Construction.** A. Audigé. *Soudure et Techniques Connexes,* v. 6, Sept.-Oct. 1952, p. 207-218.

Various tests and results developed in France. Table contains composition of carbon steels tested. 17 ref. (K9, CN)

124-K. (French.) **Development of Inert Atmosphere Welding in France.** L. Dumoulin. *Soudure et Techniques Connexes,* v. 6, Sept.-Oct. 1952, p. 221-235.

Argon-arc welding of light alloys and stainless steel, spot welding, composition of welded materials and numerous examples of application. Data are tabulated and charted. Photographs, diagrams. (K1, Al, Mg, SS)

125-K. (German.) **Cracking of Aluminum Alloy Welds.** H. Koch and K. Nagel. *Schweissen und Schneiden,* v. 4, Oct. 1952, p. 347-356.

Test procedures for determining weld cracking of light metals, its advantages, disadvantages, and results; explanation of weld cracking by hot shortness ranges of alloys; the influence of eutectic components; and healing of cracks. Advantages, disadvantages, and results of test. 16 ref. (K9, Al)

126-K. (German.) **Early and Late Pressure Welding.** H. v. Neuenkirchen. *Schweissen und Schneiden,* v. 4, Oct. 1952, p. 360-361.

These new terms, early and late, define boundaries between recrystallization welding and pressure welding giving welders a proper understanding of the processes and minimizing difficulties in designating future processes. (K2)

127-K. (German.) **Bolt Welding.** F. Busse. *Schweissen und Schneiden,* v. 4, Oct. 1952, p. 362-363.

Possibilities, apparatus, and procedure of bolt welding by the Cyc-arc process. (K1, K13)

128-K. (German.) **Newer Information in the Field of Torch Stress Relieving in Weld Seams.** Hans Kunz. *Schweissen und Schneiden,* v. 4, Dec. 1952, p. 55-64.

Expansion and contraction in welds are compared with the deformation mechanism in torch stress relieving as reversible processes. 20 ref. (K9, J1)

129-K. (German.) **Acetylene Welding Without Burner Detonation.** J. Beckstroem. *Schweissen und Schneiden,* v. 4, Dec. 1952, p. 75-79.

Importance of gas ratios and processes in the torch. Causes of detonation were determined experimentally. A new torch is described. (K2)

130-K. (Spanish.) **The Technique of Welding in Drilling Tools.** A. Matting and A. Ruiz Rubio. *Ciencia Tecnica de la Soldadura,* v. 11, July-Aug. 1952, p. 5-16.

Various methods such as electric arc and resistance welding for reinforcing handles of drills. Possibility of cementing metal and nonmetal parts together by means of plastics. Micrographs, photographs. 19 ref. (K general, TS)

131-K. (Spanish.) **Spot Welding and Its Application in the Construction of Railroad Material.** Mariano Izuzquiza. *Ciencia Tecnica de la Soldadura,* v. 11, July-Aug. 1952, p. 17-30.

Equipment and processes in manufacture of railroad coaches and electric locomotives. Photographs. Data are tabulated and charted. (K3, CN)

132-K. (Spanish.) **The Joining of Metals With Different Melting Points and Hardness by Means of Wedge Welding.** Wilhelm Hofmann, Hans-Jochen Husmann, and Rolf Koppe. *Ciencia Tecnica de la Soldadura,* v. 11, July-Aug. 1952, p. 39-42.

Welding process by which a wedge of harder metal is introduced into softer metal. Examples of application. (K6, Al, Cu)

133-K. Thin Phos-Copper Strips Speed Brazing. R. E. Ballentine. *American Machinist,* v. 97, Feb. 2, 1953, p. 124-126.

Reports that 30% average reduction in cost of brazing Cu and Cu alloys is obtained from preplaced phosphor copper strip in thicknesses as low as 0.005 in. Photographs. (K8, Cu)

134-K. Welding Research. *Automobile Engineer,* v. 43, Jan. 1953, p. 33-37.

Methods and equipment employed

at Abington by the British Welding Research Association. Photographs. (K general)

135-K. Ultrasonic Soldering. Leo Walter. *Canadian Metals,* v. 16, Jan. 1953, p. 18, 20.

Successful soldering of light metals is made easy and without need for flux. (K7, Al, Mg)

136-K. Ultrasonic Soldering to Rectify Light-Alloy Castings. *Canadian Metals,* v. 16, Jan. 1953, p. 32-33.

Ultrasonic soldering iron using Sn-Zn solder on Al patterns and light alloy castings. (K7, Al)

137-K. Stainless Steel Tow Carts of All-Welded Construction. *Canadian Metals,* v. 16, Jan. 1953, p. 42.

Brief description in which automatic and hand welding were used. (K1, SS)

138-K. Welding in Marine Engineering. H. N. Pemberton. *Engineering,* v. 175, Jan. 16, 1953, p. 73-76; Jan. 23, 1953, p. 122-124.

Role of welding in construction of boilers, steam pipe-work, engines, turbines, and auxiliary plant. New construction and repair work. Photographs and diagrams. (K general, K25, ST)

139-K. The Technology of Automatic Welding in the Soviet Union. Recent Advances. J. Mannin. *Engineers' Digest,* v. 13, Dec. 1952, p. 409-411, 438-440; v. 14, Jan. 1953, p. 14-17.

Survey of techniques of automatic arc welding under granulated flux, as developed and practiced in the Soviet Union. Improvements achieved since consolidation of basic procedures around 1947. (K1)

140-K. (English.) **Some Remarks on the Determination of Arc Welding Conditions and Subsequent Postheating for Martensitic Creep Resisting Steels.** T. Noren. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 122, 9 pages.

Hardenability testing as related to welding and calculation of preheating temperatures. (K1, J26, AY)

141-K. (French.) **Aspects of the Welding Heating Cycle.** Henri Granjon. *Fourth International Congress on Industrial Heating* (Paris), No. 177, 8 pages.

Positions of the welding heating cycle among heat treatments, and axial quenching tests on a bar heated on the end. Micrographs. (K general, J26)

142-K. Controlled Temperatures Insure Quality Welds in B-36 Landing Gear. *Industry & Welding,* v. 26, Feb. 1953, p. 42-45.

Use of automatically controlled heating equipment, laboratory designed procedures, and graphic recordings of preheat and postheat temperature cycles to reduce faulty arc welds. Photographs. (K1, AY)

143-K. Consolidation of Locomotive Welding Increases Production 33 Percent. *Industry & Welding,* v. 26, Feb. 1953, p. 58-60.

Measures used for increased efficiency at G.E., Erie, Pa. Works. Arc welding is used in all operations. (K1, T23)

144-K. Problems in Resistance Welding. H. B. Wood. *Industry & Welding,* v. 26, Feb. 1953, p. 66-67, 69.

Utility problem of providing adequate voltage for welding, without disturbing service to lighting and power customers. Tables. (K3)

145-K. Oxy-Acetylene Welding Solves Defense Plant Maintenance Problems. John H. Redmond. *Industry & Welding,* v. 26, Feb. 1953, p. 70, 73, 76, 78-79, 109.

Use of oxy-acetylene welding and cutting in routine maintenance and repair operations. Photographs. (K2, G22)

146-K. Low Hydrogen Electrodes Repair Shaft of "Unknown" Steel. *Industry & Welding,* v. 26, Feb. 1953, p. 104, 106, 108.

Techniques and materials used. Photographs. (K1, ST)

147-K. Brazing With Silver Alloys. A. Stanley Cross, Jr. *Machine and Tool Blue Book,* v. 49, Feb. 1953, p. 208-214, 216-222, 224, 226-228, 230.

Use of Cu, Al, and Ag alloys, suitable fluxes, methods of brazing, preparation for brazing, and problems encountered with Cu, brasses, bronzes, Ni alloy steel, carbon steel, cast iron and stainless steels as base metals. Diagrams. (K8, Cu, Al, Ag, Ni, AY, CN, CI, SS)

148-K. Causes and Cures of Common Welding Problems. *Machine and Tool Blue Book,* v. 49, Feb. 1953, p. 239, 241, 243, 245, 246.

Tabulated form including problem, cause, and cure. Photographs. (K general)

149-K. Designing for Spotwelding. *Machine Design,* v. 25, Feb. 1953, p. 157-159.

Basic design standards for engineering efficient spot welded assemblies from standpoint of strength and economy. Graphs. (K3)

150-K. Inert Gas Welding Plant. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 17, 1953, p. 91-93, 95, 97.

Uses, practicality, and parts involved, including a.c. transformer, high-frequency ionizer, water-cooled welding tool, and replaceable tungsten electrode with argon gas supply. Photographs. (K1)

151-K. Postwar Trends in German Welding Technology. Hans von Hoffe. *Metal Progress,* v. 63, Jan. 1953, p. 130-134, 168, 170.

Equipment and techniques. Manual gas welding; cold (forge) welding; weld testing methods; welded construction; training and qualification of welders.
(K general, Al, Cu, ST)

152-K. Designing and Building Arc Welding Fixtures. H. G. Frommer. *Modern Machine Shop,* v. 25, Feb. 1953, p. 114-129.

Three classes of welding fixtures: tacking, welding, and holding fixtures. Diagrams and photographs. (K1)

153-K. Joining Distortion Minimized. Helmut Thielsch and John R. Charlton. *Steel,* v. 132, Feb. 9, 1953, p. 92-96.

Use of resin bonding agents for joining, compared with welding. Diagrams and tables. (K12)

154-K. The Selection and Care of Welding Leads. S. E. Smith. *Welder,* v. 21, Oct.-Dec. 1952, p. 78-79.

General discussion on cable size and cable connections. (K1)

155-K. Spotlight on Arc Welding. *Welder,* v. 21, Oct.-Dec. 1952, p. 80-83.

Work of Burnett and Rolfe Ltd. of Rochester who specialize in production of welded fabrications in stainless steel, Al, and other metals. Murex stainless steel electrodes were used. Photographs. (K1, SS, Al)

156-K. Mexico Claims World's Longest Welded Spans. Guillermo S. Polanco. *Welding Engineer,* v. 38, Feb. 1953, p. 26-29, 33.

General description, which includes principal framework, frame joints, computation of loads, and balcony erection. Diagrams and photographs. (K general, T26, CN)

157-K. Seven Tough Jobs and How They Were Licked. Fred M. Burt. *Welding Engineer,* v. 38, Feb. 1953, p. 30-33.

Use of metal-arc, oxy-acetylene, oxyhydrogen, submerged-arc, inert-arc, and inert-arc metal-arc welding techniques for rebuilding cast steel shells to new dimensions, bimetallic component of thermostat, aircraft landing gear assembly, light-gage Al ducts, tanks to stand pressure of 800 psi., fabricating truncated cones of sheet Al, and rings from Al extrusions. Photographs.
(K1, K2, CI, Al)

158-K. Current, Force and Time. How They Are Measured on Resistance Welders. Dean L. Knight. *Welding Engineer,* v. 38, Feb. 1953, p. 34-38.

Includes type of equipment and methods of measuring. Photographs and diagrams. (K3)

159-K. 10 Weeks Make a Welder. H. C. Phelps. *Welding Engineer,* v. 38, Feb. 1953, p. 39-41.

Army course for training welders. (K general, U9)

160-K. Roll-Spot Technique Doubles Welding Speed. *Welding Engineer,* v. 38, Feb. 1953, p. 42.

Shows how roll-spot and seam welding time can be decreased. (K3)

161-K. To Keep Pace With Industry Tempo It's 'Back to School' for Welders. *Western Metals,* v. 11, Jan. 1953, p. 65-67.

Instruction and discusses typical problems of students at new Eutectic Welding Institute in Los Angeles. Photographs. (K general, U9)

162-K. Putting the Squeeze on Cold Welding. Norman Grossman. *Product Engineering,* v. 24, Feb. 1953, p. 176-181.

Basic design data on cold welding are available. They incorporate a critical evaluation of advantages and limitations of process and indicate factors which require additional study. Graphs and diagrams.
(K5, Al)

163-K. Manual Hidden Arc Lowers Fabricating Times. James Quigley. *Steel,* v. 132, Feb. 16, 1953, p. 74-75.

Lays down bead four to five times as fast as hand arc welding methods. Welds with deep penetration and little stress are achieved. Photographs. (K1)

164-K. Shielding Arc-Welding Processes for Jet-Engine Components. K. H. Koopman. *Welding Journal,* v. 32, Feb. 1953, p. 103-115.

Previously abstracted from *Iron Age.* See item 114-K, 1953.
(K1, AY, SS)

165-K. Vacuum Tightness of Welded and Brazed Aluminum Containers. Mike A. Miller and Allen S. Russell. *Welding Journal,* v. 32, Feb. 1953, p. 116-118.

Welded and brazed Al containers especially prepared with butt and perpendicular joints were tested for vacuum tightness. Methods of welding and brazing. Diagrams and tables. (K general, Al)

166-K. The Nature of Heat in the Welding Process. Robert T. Howard. *Welding Journal,* v. 32, Feb. 1953, p. 127-131.

Ideas about heat and how it behaves; role of heat in the metallurgical variables; and heat and the atomic model. Stainless steel was used as an example. Photographs and diagrams.
(K general, P12, SS)

167-K. Two Jigs for Welding Pipe. H. J. Adolf. *Welding Journal,* v. 32, Feb. 1953, p. 133.

Jigs can be used for pipe, tube, and bar stocks of all shapes. (K general, CN)

168-K. How Expansion and Contraction Affect Welding Results. L. M. Amburgey. *Welding Journal,* v. 32, Feb. 1953, p. 142-144.

General theory and basic control procedures that welding operator should consider on his welding jobs whether they are repair or fabrication. Diagrams. (K general)

169-K. Doubles Welding Speeds With Fast Roll-Spot Technique. *Welding Journal,* v. 32, Feb. 1953, p. 148-149.

Satisfactory technique for more rapid spot welding. Photographs. (K3)

170-K. Practical Aspects of Welding Titanium Alloys. J. J. Chyle and I. Kutuchief. *Welding Journal,* v. 32, Feb. 1953, p. 65s-73s.

Scope of investigation using inert-gas tungsten-electrode metal-arc process included factors and welding procedures such as scarf design, direction of travel (backhand or forehand), selection of He or argon gases and sequence of layer deposition. Effect of heat treatment on mechanical properties, radiographic examination, determination of mechanical and physical properties of welds, and chemical analysis of the weld metal and parent stock. Diagrams, graphs, and photographs. (K1, Ti)

171-K. Metal-Arc Welding of Aluminium-Magnesium Plate. *Welding Research,* v. 6, Dec. 1952, p. 106r-111r.

A report prepared from LM.1 Committee document, "Interim Report on an Investigation of the Arc Welding of Thick Aluminium-5% Magnesium Alloy", by J. G. Ball and P. T. Houldcroft. Test results, welding technique, and examination of microsections. Macro and micrographs. (K1, K9, Al)

172-K. Resistance Welding of Cold-Headed Bolts. J. E. Roberts. *Welding Research,* v. 6, Dec. 1952, p. 118r-123r.

Development of bolt head design for projection welding to sheet material (from 12 to 20 s.w.g.). Concludes that bolts made to provisional design can be used on long production runs. Tables. (K3, T7, CN)

173-K. Automatic Welding of Aluminum Pistons. *Railway Locomotives and Cars,* v. 127, Feb. 1953, p. 76-77.

Use of Aircomatic welding process for reclaiming Al diesel locomotive engine pistons. (K1, Al)

174-K. The Presidential Address. Robert Jenkins. *Transactions of the Institute of Welding,* v. 15, Dec. 1952, p. 151-160.

Discusses problems of residual stresses and distortion in electric arc welding. Photographs, diagrams, and graphs. (K1)

175-K. A.C. Argonarc Welding at Less Than 50 V r.m.s. Open Circuit. J. C. Needham and L. H. Orton. *Transactions of the Institute of Welding,* v. 15, Dec. 1952, p. 161-165.

Development of electronic unit permits major reduction in open circuit voltage. Diagrams. (K1)

176-K. Developments in Contact Arc Welding. D. Young and F. Zeller. *Welding and Metal Fabrication,* v. 21, Jan. 1953, p. 25-29; Feb. 1953, p. 51-54.

Contact "C18" electrode, vertical fillet welds, vertical lap welds, vertical prepared vee butt joints, horizontal vertical welding, inclined welding, and downhand welding. Graphs, tables, and diagrams. (K1, CN)

177-K. (German.) **Advances in the Field of Welding and Cutting.** K. L. Zeyen. *Schweissen und Schneiden,* v. 4, Nov. 1952, p. 402-416.

A survey of recent literature on the metallurgy of welding ferrous metals. 267 ref. (K general, ST)

178-K. (German.) **Welding Under Stress Loading.** H. Melhardt. *Schweisstechnik,* v. 6, Dec. 1952, p. 133-141.

Method for strengthening and repairing old bridges by welding. Photographs, diagrams, and graphs. (K general, T26)

179-K. (German.) **Cold Welding of Metals.** Jürgen Ruge. *Umschau in Wissenschaft und Technik,* v. 53, Jan. 1953, p. 12-13.

Reviews experiences in cold welding and equipment used. Photographs. 7 ref. (K5)

180-K. (German.) **Economics of Welded Structures.** Hans Manzinger. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, Jan. 1953, p. 5-14.

An evaluative survey of welding applications. Diagrams and photographs. (K general)

181-K. Report of Special Committee on Continuous Welded Rail. H. B. Christianson, chairman. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1161-1173.

Includes "Fabrication. Encompassing Methods of Welding, Space and Facilities Required, Organization, Procedure, and Costs." F. W. Creedle, chairman; "Laying. Encompassing Track Preparations, Transportation and Distribution of Long Rails, Installation in Track, Temperature Considerations, Closure Welds, Disposition of Rail When Continuous Rail is Replaced, Length Limitations, Procedure at Insulated

Joints, Switches, Railroad Crossings and Drawbridges, and Cost Data", F. G. Campbell, chairman; "Fastenings. Encompassing Rail Expansion, Types and Number of Anti-Creeping Devices on Welded Track and Adjacent Jointed Track, Type of Joint Bar at Ends of Welded Sections, Tie Plate and Spike Requirements, and Cost Data", J. W. Hopkins, chairman; "Maintenance. Encompassing Maintenance of Rail, Track, Fastenings, Ties, and Ballast, Including Out-Of-Face Resurfacing and Reballasting, and Cost Data", C. E. Weller, chairman and "Economics of Continuous Welded Rail Versus Jointed Track", I. H. Schram, chairman. (K general, T23, CN)

182-K. Welding in Marine Engineering. H. N. Pemberton. *Engineer,* v. 195, Jan. 23, 1953, p. 131-133; Jan. 30, 1953, p. 160-162. (Concluded.)

History of welding, various applications, and several examples of weld repairs. Photographs and diagrams. (K general, T22)

183-K. Thoriated Tungsten Electrodes Are Not Hazardous for Inert-Arc Welding. A. J. Breslin and W. B. Harris. *Industry & Welding,* v. 26, Mar. 1953, p. 37-40, 68-71.

Series of tests on possible hazards of using thoriated W electrodes in inert gas-shielded arc welding. (K1, W)

184-K. Here's How Spot Welding Builds Air-Tight Electrical Panels. Andrew Wyzeenbeek. *Industry & Welding,* v. 26, Mar. 1953, p. 49-52.

Advantages and procedure for assembly of hermetically sealed electrical feed-through terminals by annular projection, spot projection, and spot welding. (K3)

185-K. Welding of High Alloys Doubled With New Roll-Spot Technique. J. R. Fullerton. *Materials & Methods,* v. 37, Feb. 1953, p. 166, 168, 170.

Improved weld quality and increased welding speeds are achieved by modifying the drive mechanism of standard seam welders. Stainless steel, Inconel X and W, Haynes Stellite No. 25, and other crack-sensitive alloys were used. (K3, SS, Ni, Co)

186-K. Fabricated Diesel Engine Components. *Welding and Metal Fabrication,* v. 21, Feb. 1953, p. 40-45.

Assembly and welding of diesel bedplates. Photographs and diagrams. (K general, T25)

187-K. Projection Welding Studs and Bosses. R. Bushell. *Welding and Metal Fabrication,* v. 21, Feb. 1953, p. 55-57.

Reviews process and determines range of machined parts which may be satisfactorily welded in production. Diagrams and micrographs. (K3)

188-K. Welding Heavy Sections of Mild Steel. R. R. Roberts. *Welding and Metal Fabrication,* v. 21, Feb. 1953, p. 63, 68.

How weld metal cracking can be avoided when welding heavy sections of mild steel. Recommendations for plates greater than 1½ in. (K general, CN)

189-K. Applications of Welding in France. (Concluded.) G. d'Herbemont. *Welding and Metal Fabrication,* v. 21, Feb. 1953, p. 64-68.

Recent French developments in welding for naval construction, aircraft production, civil engineering equipment, construction of machine frames, and repairs. (K general)

190-K. (Dutch) **Arc Extinction in Alternating Current Arc Welding.** K. K. Zwart. *Smit Mededelingen,* v. 7, Oct.-Dec. 1952, p. 144-149.

An oscillographic study was made of "arc extinction" during a.c. welding. When voltage necessary for ignition is less than voltage available from transformer the arc will be reignited. (K1)

191-K. (Dutch) **Productivity in Manual Electric Welding.** W. A. J. Nolen. *Smit Mededelingen,* v. 7, Oct.-Dec. 1952, p. 158-162.

Several ways of increasing productivity in arc welding shops. (K1)

192-K. Metal-Bonding. R. Clements. *Aircraft Production,* v. 15, Mar. 1953, p. 76-79.

Clamping equipment designed for equal pressure-distribution. Diagrams and graphs. (K13)

193-K. Steel Fabricators Cut Costs With Automatic Welding. G. M. Mills. *Canadian Metals,* v. 16, Feb. 1953, p. 48, 50.

Application of automatic shielded-arc welding to manufacture of tanks, separators, and welded vessels. Lower production costs and improved products result. Photographs. (K1, ST)

194-K. Beryllium Copper Spot Welded Without Change in Properties. D. I. Brown. *Iron Age,* v. 171, Mar. 12, 1953, p. 142-144.

Techniques for resistance welding Berylco 25. Photographs. (K3, Cu)

195-K. Observations on Experience With Welded Ships. David P. Brown. *Journal of the American Society of Naval Engineers,* v. 65, Feb. 1953, p. 71-96.

Experience acquired with welded construction of merchant ships in U. S. prior to and during war. Diagrams. (K general, T22, CN)

196-K. The Joining of Aluminium and Its Alloys. W. V. Binstead. *Metallurgia,* v. 47, Feb. 1953, p. 81-88.

Various methods of welding, brazing, and soldering. Advantages and disadvantages in each case. Photographs. (K general, Al)

197-K. Welding Structural Magnesium With a 50-50 Mixture of Helium and Argon. C. Ridgely Kemp. *Welding Engineer,* v. 38, Mar. 1953, p. 39-41, 46.

Fabrication of Mg ramps. Development of welding techniques. Photographs. (K1, Mg)

198-K. Will Inert-Gas Metal-Arc Save Money on Mild Steel? G. C. Christopher and R. C. Becker. *Welding Engineer,* v. 38, Mar. 1953, p. 42-46.

Investigation to determine adequate welding procedure. Tables and graphs. (K1, CN)

199-K. Heavy Weldments Call for Careful Welding and Planning. Clyde B. Clason. *Welding Engineer,* v. 38, Mar. 1953, p. 48-50.

Use of submerged welding to fabricate austenitic stainless steel marine equipment. Also welding chain links. Photographs. (K1, SS)

200-K. (Spanish.) **Influence of the Degree of Deoxidation and the Nitrogen Content of the Deposited Metal in the Arc Welding of Carbon Steels.** José Maria Sistiaga. *Ciencia y Tecnica de la Soldadura,* v. 11, Sept.-Oct. 1952, 18 pages.

A theoretical study. Macrographs, tables, and charts. 29 ref. (K1, CN)

201-K. (Spanish.) **Welded Construction of Three Gas-Purification Columns Subjected to Pressure.** M. de Miro Ramonacho. *Ciencia y Tecnica de la Soldadura,* v. 11, Sept.-Oct. 1952, 11 pages.

Features, calculations and various testing processes. Micrographs, tables, and diagrams. (K9)

202-K. (Book.) **Pocket Manual of Arc Welding.** Lew Gilbert, ed. 172 pages. Industrial Book Co., 1240 Ontario St., Cleveland 13, Ohio. $1.25.

Features "how-to" information on welding of mild, alloy, stainless steels; and hard surfacing and welding of other ferrous metals. Includes chapters on causes and cures of common welding troubles; welding symbols and how they are used; simple qualification tests for operators; and types of joints and typical welding positions. (K1, CI, AY, SS)

203-K. (Book.) **Welding Practice. v. 2. Welding of Ferrous Metals.** 198 pages. Butterworth's Scientific Publications Ltd. 4-6 Bell Yard, Temple Bar, London W. C. 2, England. 22s. 6d.

Each of the seven chapters is built around metallurgical factors, guidance to designers, welding materials, workshop practice, and special applications. Chapters deal with welding of mild steel by metallic-arc process; mild steel welding by processes other than metallic arc; welding of low alloy and Cr-Ni steels; welding of cast iron; weld details for pressure vessels; and hard surfacing by welding methods. (K general, ST, CI)

204-K. Small Rivets for Big Jobs. Robert M. Gordon. *Product Engineering,* v. 24, Mar. 1953, p. 119-127.

Use of tubular, semitubular, and small diameter rivets for joining low-cost, high-production assemblies. Recommended clinch allowances, hole clearances, and joint configurations for various rivet sizes. Diagrams, photographs, and tables. (K13)

205-K. A Review of the Compositions, Properties and Uses of Silver Solders in Industry. W. J. Smellie. *Sheet Metal Industries,* v. 30, Mar. 1953, p. 193-201, 206.

Includes joint making ability of Ag solders, properties of Ag-soldered joints, methods of heating, and choice of brazing method and solder. Photographs and graphs. (K7, Ag, SG-f)

206-K. The Welding of Austenitic Corrosion- and Heat-Resisting Steels. *Sheet Metal Industries,* v. 30, Mar. 1953, p. 217-228, 244.

Review of welding methods, types of steel available, metal-arc process, automatic metal-arc welding of 18-8 type steel using covered electrodes, inert-gas-shielded metal-arc welding with consumable electrodes, and seam welding. Micrographs, photographs, and tables. (K1, SS)

207-K. Inert-Gas Metal-Arc Welding of Aluminium Alloys. P. T. Houldcroft. *Welding and Metal Fabrication,* v. 21, Feb. 1953, p. 58-61; Mar. 1953, p. 99-102.

Methods of welding in which features of flux-coated metal and tungsten-arc are combined. Preparation for welding, welding techniques, special equipment for shipbuilding, and weld strengths. (K1, Al)

208-K. Inert-Arc Welding Technique for Eliminating Backing Rings in Piping. R. A. Mueller and W. B. Root. *Welding Journal,* v. 32, Mar. 1953, p. 205-214; disc., p. 214-216.

Numerous experimental and actual shop welds on a variety of pipe materials which successfully demonstrate the practicability of inert-arc welding method. Tabulates information for carbon steel, Cr-Mo steels, and Type 347 stainless steel. Photographs, micrographs, and diagrams. (K1, CN, AY, SS)

209-K. Resistance Welding of Dissimilar Metals to Magnesium for Electrical Connections. Paul Klain and H. W. Croisant. *Welding Journal,* v. 32, Mar. 1953, p. 217-224.

Method for attaching wires to Mg dry batteries and to other Mg parts where electrical contact is necessary. Conditions for direct welding of Cu and other wires to Mg. Tables, micrographs, and photographs. (K3, Mg, Cu, Zn, ST)

210-K. Unity in Welded Steel Construction. Robert S. Hale. *Welding Journal,* v. 32, Mar. 1953, p. 225-229.

Full potentialities and advantages of welding as a construction tool; problems encountered during fabrication; and practical methods to control distortion. Diagrams and photographs. (K general, ST)

211-K. Temperature Distribution During Flash Welding of Steel. Part II. E. F. Nippes, W. F. Savage, S. S. Smith, J. J. McCarthy, and G. Grotke. *Welding Journal,* v. 32, Mar. 1953, p. 113s-122s.

Effects of parabolic flashing conditions on temperature distribution in AISI 1020 steel were studied using round specimens of three different diameters. Graphs and tables. 5 ref. (K3, CN)

212-K. The Role of Weld Metal Area in Welding Hardenable Steels. C. R. McKinsey and J. F. Collins. *Welding Journal,* v. 32, Mar. 1953, p. 125s-131s.

Studies of fundamental relationships of various factors influencing the heat-affected zone in hardenable steels. Graphs and micrographs. (K9, ST)

213-K. Effects of Carbon, Oxygen, and Nitrogen on Welds in Titanium. D. C. Martin. *Welding Journal,* v. 32, Mar. 1953, p. 139s-154s.

Investigation to determine limits of C, O_2, and N_2 which can be tolerated in Ti spot welds and welds made with inert-gas shielded arc. Tables, diagrams, graphs, and micrographs. (K1, K3, Ti)

214-K. The Weldability of Austenitic Manganese Steels. F. Danhier. *Welding Journal,* v. 32, Mar. 1953, p. 155s-156s.

Extended abstract by G. E. Claussen from *Arcos,* July 1952, p. 3203-3217. Effects of C, Si, P, and of the electrode composition. (K9, AY)

215-K. It's Easy to Braze Titanium. Harlan L. Meredith. *American Machinist,* v. 97, Mar. 30, 1953, p. 120-121.

Use of pure Ag filler metal, induction heat, inert gas shielding, and proper joint design. (K8, Ti)

216-K. Local Carbide Segregation and Decarburization in Welded Joints. H. S. Blumberg and I. A. Rohrig. *Combustion,* v. 24, Mar. 1953, p. 36-41.

Investigation of welded Cr-Mo steel in steam power plant service. Tables and micrographs. (K9, AY)

217-K. Here's How Welding Builds Stainless Steel "Lungs" for B-29's. *Industry & Welding,* v. 26, Apr. 1953, p. 42-43, 45, 73.

Welding problems, types of welding, and parts. Photographs. (K general, T24, SS)

218-K. Production-Line Setup Speeds Fabrication of All-Welded Boilers. Fred D. Mosher. *Industry & Welding,* v. 26, Apr. 1953, p. 59-60, 62, 92, 94-95.

Standardization and partial assembly-line welding production methods in the building of package boilers. Photographs. (K general, T26)

219-K. Setup, Preparation and Procedure For Welding Navy Flying Boats. Lou Barrett and Chuck Wood. *Industry & Welding,* v. 26, Apr. 1953, p. 64-68, 70-71.

Inert-gas shielded arc, resistance, and shielded metallic-arc methods of welding. Photographs. (K1, K3)

220-K. Aluminum Additive Eliminates Porosity in Inert-Gas Arc Welding Operations. Matthew S. Mirantz. *Industry & Welding,* v. 26, Apr. 1953, p. 75-76, 78-79.

Addition of Al during inert-arc welding of rimmed steels to stop turbulence caused by escaping gases and also produce sound welds. (K1, CN)

221-K. Pure Silver Forms Strongest Brazed Joints in Titanium. H. L. Meredith. *Iron Age,* v. 171, Mar. 26, 1953, p. 143-146.

Advantages of using inert-induction Ag brazing. Micrographs and photographs. (K8, Ti, Ag)

222-K. A New Maintenance Tool for Steel Mill Use. J. J. Barry. *Iron and Steel Engineer,* v. 30, Mar. 1953, p. 92-97; disc. p. 97.

New arc welding process and equipment that simplify repair and maintenance operations. Photographs. (K1)

223-K. Advanced Planning Leads to Consistent, High Quality Spotwelds. J. Heuschkel. *Materials & Methods,* v. 37, Mar. 1953, p. 88-91.

Problem of producing quality welds which do not require checking. (K3)

224-K. Practical Stud Welding. R. W. Taylor. *Metal Industry,* v. 82, Mar. 20, 1953, p. 225-227.

Early difficulties in development

of stud welding, and the process as it is practiced today. Features necessary for its success. Photographs. (K1)

225-K. Welding Stainless Steels Has Its Problems. W. G. Blackwell. *Steel,* v. 132, Apr. 6, 1953, p. 138-139.

Compares carbon steel, straight Cr steel, and Cr-Ni steel with respect to electrical resistance, thermal conductivity, melting points, and coefficients of expansion. Gives practical considerations for minimizing welding problems.
(K general, P general, CN, AY)

226-K. Metal Bonding. A Report on Current Practices. O. W. Loudenslager. *Tool Engineer,* v. 30, Apr. 1953, p. 78-84.

Abstract of paper 21T12, American Society of Tool Engineers. Processing problems, physical properties of adhesives, uses of high-strength adhesives; and sandwich materials, core materials, processing, properties, testing materials, and future developments. Photographs. (K12)

227-K. (French.) Generalized Conditions for Welding Metallic Frameworks. H. Lepeu. *Soudure et Techniques Connexes,* v. 6, Nov.-Dec. 1952, p. 286-289.

Arc welding of a building framework made of bessemer steel. Photographs. (K1, T26, CN)

228-K. (French.) A Case of Cracking by Parasitic Arcs. R. Quigna. *Soudure et Techniques Connexes,* v. 6, Nov.-Dec. 1952, p. 291-292.

Presence of cracks near the weld bead of a piece of soft steel. Micrographs. (K1, CN)

229-K. The Electric Arc in Argon and Helium. T. B. Jones, Merrill Skolnik, and W. B. Kouwenhoven. *Applications and Industry,* Mar. 1953, p. 16-21.

Progress report of the study of arc characteristics in various atmospheres using argon and helium with tungsten electrodes. Graphs and diagrams. (K1, W)

230-K. Submerged Arc Welding Saves Time. *Canadian Metals,* v. 16, Mar. 1953, p. 46-47.

Time saving in fabrication of heavy steel by using submerged-arc welding and a new technique which eliminates preliminary hand welding. (K1, ST)

231-K. Soldering and Brazing With Paste Alloys. D. C. Dilley. *Electrical Manufacturing,* v. 51, Apr. 1953, p. 119-123, 360.

Performance of solder joints can be improved and costs reduced by using powdered solder alloys blended with fluxing, cleaning, and tinning agents. Photographs. (K7, K8)

232-K. Power Supplies and Resistance Welders. A. B. White. *Industry and Power,* v. 64, Apr. 1953, p. 86-89, 100.

Analyzes original problems and shows how recent improvements are producing greater satisfaction for both distribution and welding engineers. Diagrams. (K3)

233-K. Rotating Fixtures Speed Manual Silver Brazing. *Industry & Welding,* v. 26, Apr. 1953, p. 47-49, 51.

Equipment and handling techniques. Photographs. (K8)

234-K. Make Your Electric Welding Operations Safer. W. Schweisheimer. *Iron Age,* v. 171, Apr. 2, 1953, p. 160-161.

Hazards and ways to overcome them. (K1, A7)

235-K. Resistance Welding Gives Better Glass-to-Metal Joints. A. J. Wyzenbeek. *Iron Age,* v. 171, Apr. 9, 1953, p. 146-148.

Advantages of using resistance welding for hermetically sealing electrical feed-through terminals. Diagrams and photographs.
(K11, K3)

236-K. Electrical Contacts Align Weld Jig. George Morton. *Modern Machine Shop,* v. 25, Apr. 1953, p. 144-146.

How a critical tube welding alignment problem was solved by using an electrical "saddle-equipped" jig. (K1)

237-K. Designing Around Inert-Gas Metal-Arc Welded Stainless, Nickel and Stainless Clads, Copper, Copper-Base Alloys, and Aluminum. J. H. Berryman. *Product Engineering,* v. 24, Apr. 1953, p. 171-173.

Characteristics of the process. (K1, SS, Ni, Cu, Al)

238-K. Welding Fills the Bottle. *Steel Horizons,* v. 15, no. 1, 1953, p. 12-13.

Joining Cr-Ni steel to straight Cr steel. Photographs. (K general, SS)

239-K. Underframes. A Job for Automatic Welding and Cutting. Fred M. Burt. *Welding Engineer,* v. 38, Apr. 1953, p. 39-41, 52.

Fabrication methods employed for underframes of 40-ft. boxcars. Flame cutting of plates and joining cross members. Photographs. (K1, G22)

240-K. Braze Welding on Big Repair Jobs. Herman C. Phelps. *Welding Engineer,* v. 38, Apr. 1953, p. 44-47.

Six examples of making big repairs on heavy equipment. Photographs. (K8, CI, Cu)

241-K. Brazing as a Production Medium. Lester F. Spencer. *Welding*

Engineer, v. 38, Mar. 1953, p. 52-56; Apr. 1953, p. 53-57.

Brazing strength vs. clearance and selection of brazing alloys and fluxes. Torch, resistance, and incandescent brazing; induction heating; salt bath; and controlled-atmosphere furnace. Problems pertaining to brazing of Al alloys, Cu-base alloys, carbon steels, stainless steels, and high-Ni alloys. Helpful hints on joint design and on methods for supporting the assemblies prior to and during brazing. (K8, Al, Cu, CN, SS, Ni)

242-K. What Kind of Welding Is It? *Welding Engineer,* v. 38, Apr. 1953, p. 62-63.

A 40-kva. combination forming machine and resistance welder which satisfactorily joins Cr-plated steel tubing. Photographs. (K3, G general, ST, Cr)

243-K. (French.) **Welding in the John Cockerill Shipyards at Hoboken, Belgium.** M. Conrad, H. Herbiet, and H. Bersoux. *Revue de la Soudure,* v. 8, no. 3, 1952, p. 134-144.

Shows that material and labor costs are reduced by welding. (K general, T22, CN)

244-K. (German.) **Gas Blisters in Welded Seams.** W. Hummitzsch. *Schweisstechnik,* v. 7, Jan. 1953, p. 1-6.

Blister and pore formation by sulphur during welding with covered electrodes and bare wires. (K1)

245-K. (German.) **Welding Under Stress.** (Concluded.) H. Melhardt. *Schweisstechnik,* v. 7, Jan. 1953, p. 6-11.

Bridging of weak spots by hard facing; welding ribs and joints. The making of a bridge bar is also included. Diagrams. (K general, L24)

246-K. (German.) **Gas Welding of 18-8 Cr-Ni Steel.** H. Siegenthuler. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, Feb. 1953, p. 25-29.

Bending, corrosion, chemical, and metallographic tests which illustrate the dangers involved in older methods of gas welding. (K2, K9, SS)

247-K. (Book.) **Basic Welding Principles.** Emanuele Stieri. 220 pages. Prentice Hall, Inc., 70 Fifth Ave., New York 11, N. Y. $5.75.

Two sections consist of oxy-acetylene welding and cutting, and electric arc welding. (K general)

248-K. (Book.) **Industrial Brazing.** H. R. Brooker and E. V. Beatson. 344 pages. Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E., 1, England. (British Book Center, 122 East 55th St., New York 23, N. Y.) $7.50.

Problems involved in selecting appropriate brazing process for various types of work. Suggestions for improved methods of inspection and testing. (K8)

249-K. (Book.) **Weldability of Metals.** (Procedure Handbook of Arc Welding Design and Practice.) Ed. 9. Chap. II. 142 pages. 1952. Lincoln Electric Co., 12818 Coit Rd., Cleveland 17, Ohio.

Characteristics affecting weldability; tests for checking weldability; choice of steels; effect of common elements; and effect of heat on weld and base metal. Welding of high-Mn steels, Al alloys, Cu, Ni, clad steels, forgings, cast steel, cast iron, wrought iron, ingot iron, galvanized steel, terne plate, and enameling stock. (K9)

250-K. (Book.) **The Welding of Austenitic Corrosion and Heat Resisting Steels.** 207 pages. British Welding Research Assoc., 29 Park Crescent, London, W. 1, England. 27s. 6d. net.

Deals with individual processes, describing equipment, recommended techniques, and quality of the resultant welds. Includes metal-arc, submerged-arc, argon-arc, oxy-acetylene, atomic hydrogen, carbon-arc, resistance and oxy-acetylene pressure welding. Also concerned with oxygen cutting methods, heat treatment after welding, surface finishing, inspection, and welders' competency tests. (K general, SS)

251-K. (French and German.) **Problems in Welding Research.** Carl G. Keel. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, Mar. 1953, p. 47-51.

Discusses crack sensitivity and cold brittleness of structural steels. Diagrams. (K general, Q23, ST)

252-K. (German.) **Cold-Press Welding as a Modern Form of Joining.** W. Hofmann and J. Ruge. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 95, Mar. 11, 1953, p. 233-237.

Various aspects of cold-press welding. Diagrams and graphs. 9 ref. (K5)

253-K. (Swedish.) **Base Metal Welding With Austenitic Manganese Steel Electrodes.** Stig-Erik Erikson. *Svetsaren,* v. 17, no. 2, 1952, p. 15-20.

Use of high Mn electrodes for welding carbon steels. Micrographs. (K1, CN)

254-K. Temperature for Shrink Fits. Tyler Hicks. *American Machinist,* v. 97, Apr. 27, 1953, p. 163.

Chart which permits fast estimation of temperature needed to expand a metal ring a given amount before making shrink fits. (K13)

255-K. Welding Stainless Steels. W. M. Halliday. *Canadian Metals,* v. 16, Apr. 1953, p. 52, 54.

Details of a welding flux that has proved satisfactory. (K1, SS)

256-K. Welding Tool Steels. B. H. Chambers. *Edgar Allen News,* v. 32, Apr. 1953, p. 73-76.

Reviews 25 years of progress and research in the production of welded tools. Brazing is not included. (K general, TS)

257-K. Spot Welds in Unalloyed Titanium. *Light Metals,* v. 16, Apr. 1953, p. 120-121.

Tests and results. Micrographs. (K3, Ti)

258-K. Developments in the Metal Arc Welding of Aluminium and Its Alloys. W. I. Pumphrey, E. Van Someren, and M. R. Kilgour. *Light Metals,* v. 16, Apr. 1953, p. 132-135.

Defects of metal-arc welds, choice of electrodes, welding procedure, and preheating. Tables. (K1, Al)

259-K. Welding Rod. How to Choose It. *Linde Tips and Oxy-Acetylene Tips,* v. 32, Apr. 1953, p. 38-39.

Tabulated information covers Oxweld welding rod, purpose, qualities, flame, and Oxweld flux. (K2)

260-K. Dip Brazing Cuts Costs in Making Aluminum Heat Exchangers. *Modern Metals,* v. 9, Apr. 1953, p. 40-41.

Process which employs a bath of molten brazing flux into which a properly jigged assembly of Al parts is dipped for a predetermined period. A filler material fuses with the parent material and provides a strong pressure-tight bond. Photographs. (K8, Al)

261-K. High - Speed Photographic Techniques for the Study of the Welding Arc. I. L. Stern and John H. Foster. *Society of Motion Picture and Television Engineers, Journal,* v. 60, Apr. 1953, Part I, p. 400-404.

Detailed specifications for use of high-speed photography at rates of 3000 to 4000 frames per sec. Photographs. (K9)

262-K. Bonding Rubber to Metal—Design and Production Problems. J. H. Gerstenmaier. *Tool Engineer,* v. 30, May 1953, p. 59-62.

Abstracted from paper 21T13, "Bonding Methods for Adhering Rubber to Metal", American Society of Tool Engineers. Describes basic mechanical adhesives, types of rubbers, and application methods. Diagrams and photographs. (K11)

263-K. Welded Portal Frame Retort House. *Welding and Metal Fabrication,* v. 21, Apr. 1953, p. 116-123.

Design, construction, and welding details of a portal-frame retort house. Photographs and diagrams. (K general, T26)

264-K. Electrodes for Welding 18% Cr-8% Ni Steels. H. F. Tremlett. *Welding and Metal Fabrication,* v. 21, Apr. 1953, p. 136-144.

Weld decay, probable cause, prevention, and standard tests for assessing the weld decay resistance of steels and weld metals. Tables and micrographs. (K1, SS)

265-K. X-Ray Welds for Aluminum Tanks. Jerome Hertel. *Welding Engineer,* v. 38, Apr. 1953, p. 64, 69.

Briefly describes the inert-gas, tungsten-arc welding process. Photographs. (K1, Al)

266-K. Advanced Information for the Brazing Operator. E. F. Davis. *Welding Journal,* v. 32, Apr. 1953, p. 293-298.

The brazing of different materials; fluxes and their limitations; and design of joints and brazing alloys. (K8)

267-K. Anderson Ranch Dam Penstock Test Fracture Repaired by Welding. P. J. Bier. *Welding Journal,* v. 32, Apr. 1953, p. 313-319.

Design of penstock and outlet pipe systems; welding techniques; and successful repair of a fracture in the pipe shell. Diagrams and photographs. (K1, T4, CN)

268-K. Manual Hidden Arc Welders Halve Time on Earth Mover Components. William T. Potter. *Welding Journal,* v. 32, Apr. 1953, p. 324-328.

Application of automatic and semi-automatic submerged-arc welding in the fabrication of heavy earth-moving equipment. Photographs. (K1, CN)

269-K. The Welding of Thick Plates of High-Strength Aluminum Alloys. D. C. Martin, M. I. Jacobson, and C. B. Voldrich. *Welding Journal,* v. 32, Apr. 1953, p. 161S-171S.

Investigation to determine by what means high-strength welded joints could be produced in thick plates of strong Al alloys. Development of improved filler-metal alloys. Graphs and tables. 10 ref. (K1, Al)

270-K. Control of Penetration and Melting Ratio With Welding Technique. Clarence E. Jackson and Arthur E. Shrubsall. *Welding Journal,* v. 32, Apr. 1953, p. 172S-178S.

Penetration and melting ratio were measured for a large number of submerged-arc and coated-electrode welds in commercial quality steel using various joint designs. Useful

formulas were developed for estimating penetration characteristics of a weld given the machine settings. Graphs and diagrams. 10 ref. (K1, CN)

271-K. The Semiautomatic Inert-Gas Metal-Arc Welding of Aluminum Alloys. Charles T. Gayley, Joseph R. Girini, and Walter H. Wooding. *Welding Journal,* v. 32, Apr. 1953, p. 179S-190S.

Shows that tensile properties of welded joints are affected more seriously in the precipitation-hardened Al alloys than in the cold worked and stabilized alloys. Graphs, diagrams, and tables. (K1, Q27, Al)

272-K. Gas Flow Requirements for Inert-Gas-Shielded Arc Welding. Glenn J. Gibson. *Welding Journal,* v. 32, Apr. 1953, p. 198S-208S.

Factors which determine the flow of inert gases required for gas coverage and methods used for measuring them. Graphs and photographs. (K1)

273-K. New 'One-Step' Fastening Method Buttons Metal To Metal Without Rivets, Bolts. *Western Metals,* v. 11, Apr. 1953, p. 51-52.

Method which utilizes the principle of the common dressmaker snap. Photographs. (K13)

274-K. Proper Choice of Materials, Procedure Major Factors In Rohr's Complex Production Welding. J. T. Maloney. *Western Metals,* v. 11, Apr. 1953, p. 65-67.

Defines various welding techniques used for different parts of the work, including arc, inert-arc, and oxy-acetylene. Skill and care which are required to acquire quality demanded for steel and Al assemblies. Photographs. (K1, K2, ST, Al)

275-K. (Russian.) **Arc Welding of Copper Using Copper Electrodes.** P. T. Dmitriev, N. M. Stepanov-Grebennikov, and N. I. Makeev. *Avtogennoe Delo,* v. 23, Aug. 1952, p. 1-4.

Over 70 variations of coating composition were tested. Microstructures, mechanical properties, and corrosion stabilities of the welds were determined. (K1, Q general, M27, R general, Cu)

276-K. (Russian.) **Conditions of Formation and Properties of Ferrite Banding During Pressure Welding.** A. S. Fal'kevich. *Avtogennoe Delo,* v. 23, Aug. 1952, p. 8-12.

Mechanical properties and microstructures of gas welded and induction welded tubes were determined. Tables and photomicrographs. (K2, Q general, M27, ST)

277-K. (Russian.) **Single-Pass Welding of 1X18H9T Tubes With a Ceramic Backup.** Iu. I. Kazennov. *Avtogennoe Delo,* v. 23, Aug. 1952, p. 22-23.

Use of ceramic backup rings for welding small stainless steel tubing (less than 50 mm.). (K general, SS)

278-K. (Russian.) **Automatic Submerged Arc Welding of Thin-Walled Containers.** M. I. Liber and V. N. Shmidman. *Avtogennoe Delo,* v. 23, Aug. 1952, p. 28-29.

Process is described. Joints were found to be more corrosion resistant than the base metal. (K1, R general, SS)

279-K. U. S. Army's New Atomic Rifle Carried by 8,200 Ft. of Welding. J. C. Spurgeon. *Industry & Welding,* v. 26, May 1953, p. 45-48, 50, 122-123.

Special welding techniques which maintain ⅛-in. tolerances in 38½-ft. weldments. Photographs. (K1, AY)

280-K. All-Welded Stainless Steel Flasks Operate at Pressures up to 3,000 Psi. A. Grodner. *Industry & Welding,* v. 26, May 1953, p. 54-55.

Welded fabrication of stainless steel high-pressure injection flasks. Diagrams. (K general, SS)

281-K. Safe Practices in Resistance Welding. Andrew E. Rylander. *Industry & Welding,* v. 26, May 1953, p. 58-60, 62.

Safety measures and devices. Photographs. (K3, A7)

282-K. Submerged-Arc Welding Reduces Weight of Kilns by 15 Percent. E. Krainer. *Industry & Welding,* v. 26, May 1953, p. 66-68, 70-71.

Details of construction and advantages. Photographs. (K1)

283-K. Automatic Inert-Arc Process Minimizes Iron "Pick-Up" in Welding Nickel-Clad. Richard G. Lyall. *Industry & Welding,* v. 26, May 1953, p. 82-84, 86.

New, fast welding process which can improve efficiency in fabrication of clad metals. (K1, ST)

284-K. How to Weld Copper-Clad Steels. *Industry & Welding,* v. 26, Apr. 1953, p. 101-102, 104; May 1953, p. 97-98, 100-101.

Principles and proper procedures for arc welding Cu-clad steels. Diagrams. (K1, Cu, ST)

285-K. The Welding of Mild Steel to Cast Iron. C. C. Bates. *Institute of Welding, Transactions,* v. 16, Feb. 1953, p. 5-11.

Welding of mild steel studs to gray cast iron was studied and a procedure evolved. Physical properties of fillet welds with and with-

out "buttered pads". It was shown that it is possible to weld mild steel studs to heavy section gray cast iron and to obtain bend and torque strengths approaching those of the parent stud. Diagrams, tables, and photographs.
(K general, Q general, CI)

286-K. Further Observations on Shipyard Layout and Technique for Welded Construction. H. H. Hagan. *Institute of Welding, Transactions,* v. 16, Feb. 1953, p. 12-16.

Effects of reducing number of berths, layout space, prefabrication shop area for hull steel, size of the berth cranes, and erection of welded ships. Development of weld examination by X-ray and γ-ray equipment. Welding technique, labor demarcation problems, and cost of welding. Diagrams and photographs. (K1, T22, S13, CN)

287-K. Active Metals Used as Brazing Alloys. *Metal Progress,* v. 63, Apr. 1953, p. 180, 182, 184.

Condensed by L. E. Abbott from "Metal to Nonmetallic Brazing", by C. S. Pearsall and P. K. Zingeser, Technical Report 104, Electronics Research Laboratory, Massachusetts Institute of Technology.
(K8, Ti, Zr, Cb, Ta)

288-K. Development of Training and Jointing Techniques to Prolong the Life of Lead Cable Sheath. G. H. Fiedler and E. J. Nelson. *Power Apparatus and Systems,* Apr. 1953, p. 191-197; disc., p. 197-201.

Results of laboratory and field studies of the life of lead cable sheath as affected by mechanical movement. Possible solution to the problem of repair of field failures. Graphs and photographs. (K13, Pb)

289-K. How to Braze and Solder Zirconium. W. G. Schickner, John G. Beach, and C. L. Faust. *Steel,* v. 132, May 4, 1953, p. 118-119.

Shows that Zr can be soldered and brazed by regular methods if they are dipped in molten $ZnCl_2$ first. (K7, K8, Zr)

290-K. Spot Welding of Low-Carbon Steels, 24 S.W.G. and ⅛ In. Thick. H. E. Dixon and J. E. Roberts. *Welding Research,* v. 7, Feb. 1953, p. 3r-15r.

Experimental technique used to determine the optimum spot welding conditions for 24 s.w.g. mild steel sheet. Spot welding of ⅛-in. steel was also tested for strength and consistency over a wide range of conditions. Graphs, tables, and photographs. (K3, CN)

291-K. Measurement of Spot Welding Machine Variables. H. E. Dixon, J. E. Roberts, and T. M. Roberts. *Welding Research,* v. 7, Feb. 1953, p. 16r-24r.

Methods developed for the control of condenser discharge machines and applicable to other types of resistance welding equipment. Diagrams. (K3)

292-K. Welding Speeds Doubled. William P. Brotherton. *Western Machinery and Steel World,* v. 44, Apr. 1953, p. 88-89.

New technique and modified facilities increase spot welding speeds more than 100%. Photographs. (K3)

293-K. (Book.) **Electric Arc Welding.** John Benjamin Austin. 280 pages. 1952. American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill.

Handbook which serves as general background. Describes welding plant, electrodes, accessories, weldability of common metals and alloys, hard facing, pipe welding, machinery, and structural welding. Deals briefly with automatic arc welding. (K general)

294-K. Metallographic Examination of Ceramic-Metal Seals. A. G. Pincus. *American Ceramic Society, Journal,* v. 36, May 1953, p. 152-158.

Making of taper sections of ceramic-to-metal seals. Applications to research in adherence mechanisms and production trouble shooting. (K11)

295-K. Operating Experiences With Mechanical Joints in High-Pressure High-Temperature Steam Piping. E. C. Bailey, H. C. Schroeder, and I. H. Carlson. *ASME, Transactions,* v. 75, Jan. 1953, p. 97-101.

Results of investigation to determine suitability of several mechanical joints for joining 2¼% Cr, 1% Mo alloy steel to Type 347 stainless steel. Tests were made on pressure-seal and bellows-type joints. (K13, AY, SS)

296-K. The Right Rivet for the Right Job Can Save You Time and Money. Robert M. Gordon. *Machine and Tool Blue Book,* v. 49, Apr. 1953, p. 162-166, 168, 170-171; May 1953, p. 218-220, 222, 224, 226-232.

Types of rivets, riveting machines, tools used in riveting operations, and specific applications of various types of rivets. Photographs. (K13)

297-K. Welding the Stainless Steels. Helmut Thielsch. *Materials and Methods,* v. 37, May 1953, p. 115-130.

Electrodes for stainless steels; welding austenitic, martensitic, and ferritic grades; and procedures, joint designs, and preparation. Tables and photographs.
(K general, SS)

298-K. The Research Approach to Welding. W. A. Martin. *Ontario Hydro Research News,* v. 5, Jan.-Mar., 1953, p. 1-3, 6.

A general study of some factors involved in welding. (K9)

299-K. Improvised Welder Meets a Crisis. Richard Avery. *Steel,* v. 132, May 18, 1953, p. 112-113.

Conversion of a semi-automatic into an automatic welder for fabricating steel tanks. Photographs. (K1, ST)

300-K. (French.) **Consideration in the Study of Fluxes.** G. M. Blanc and B. H. Deglon. *Revue Soudure,* v. 8, no. 4, 1952, p. 233-238.

A general discussion as applied to welding and brazing. Suggests a plan based on present literature. Extensive bibliography. (K general)

301-K. Five Simple Rules for Making Copper Tube Joints. John S. Coe. *Heating, Piping, & Air Conditioning,* v. 25, May 1953, p. 88-89.

Practical pointers for soft soldering. Hard soldering procedures. (K7, Cu)

302-K. Pop Rivet Fasteners for Aircraft. G. C. Bailey and P. C. Ergler. *Product Engineering,* v. 24, May 1953, p. 191-198.

Results of test programs which prove the pop rivet to be worthy of consideration by designers in airframe and other industries. Combines low cost, high strength, and endurance. Tables, graphs, diagrams. (K13)

303-K. Resistance Welding. Then and Now. Joe Harner. *Sheet Metal Worker,* v. 44, May 1953, p. 62, 64-65.

Hypothetical case was used to discuss each step in setting up and placing the welder in operation. (K3)

304-K. Spot Welding of Mild Steel (EN2C) and "Corten" Low Alloy Steel for Structural Purposes. W. S. Simmie. *Welding and Metal Fabrication,* v. 21, May 1953, p. 170-174.

Materials, test procedure, and results. Graphs, tables, photographs. (K3, CN, AY)

305-K. Flash Welding High Tensile Steel Tubes. H. Brooks. *Welding and Metal Fabrication,* v. 21, May 1953, p. 177-184.

Measurements were made to determine the effects of process variables on temperatures produced in high-tensile alloy steel tubes by flashing phase of the welding cycle. Most important effects are flashing distance and speed. Graphs. (K3, AY)

306-K. Practical Aspects of Welding and Metalworking. *Welding and Metal Fabrication,* v. 21, May 1953, p. 185-186.

Fabrication of wrought brass, high-tensile brasses, and preparation of sheet and plate. (K general, G general, Cu)

307-K. (French.) **Resistance Welding of Light Metals.** Charles Guinard. *Revue de l'Aluminium,* v. 29, no. 193, Nov. 1952, p. 417-422; v. 30, no. 195, Jan. 1953, p. 35-40; v. 30, no. 196, Feb. 1953, p. 67-74. (Concluded.)

Part I: Various aspects of the technique. Part II reviews machines which can be fixed or mobile in the case of clamp units. Part III: Adjustment and checking of test pieces, as well as the parameters of spot welding. Roller and butt welding are included. (K3, Al)

308-K. (Spanish.) **Causes and Remedies of the Most Common Troubles in Arc Welding.** *Fusion de Metals,* v. 16, no. 2, Apr., May, June 1953, p. 7-10.

Four points necessary for good welding; proper electrode, arc length, speed, and adequate current. (K1)

309-K. Rubber Strip Adhesion Tester. S. A. Eller. *ASTM Bulletin,* May 1953, p. 41-42.

Apparatus used in measuring force required to separate a rubber strip from a metal base at a definite jaw separation speed and with the separating force applied at right angles to the base. (K12)

310-K. Bonding Plasticized P.V.C. to Metal. A. Blake. *British Plastics,* v. 26, May 1953, p. 160.

Experiments with various methods of bonding. (K11)

311-K. Speeding Soldering of Automobile Radiator Sections. *Industrial Gas,* v. 31, May 1953, p. 7.

Method of using heated air which sweats tinned tubular parts together in average of 38 sec. Automatic controls hold air at 550 to 660° F. Diagrams. (K7, S16)

312-K. Synthetic-Resin Adhesives and Their Applications. S. Hopwood. *Plastics Institute, Transactions,* v. 21, Apr. 1953, p. 77-88; disc., p. 88-89.

Various types of adhesives and glues and their applications. Synthetic resins capable of making joints between metals stronger than riveting or welding. (K12, Al)

313-K. Esna's Fascinating Fasteners. *Steel Horizons,* v. 15, no. 2, 1953, p. 10-11.

Describes stainless steel nails, nuts, and other fasteners. Photographs. (K13, T7, SS)

314-K. Some Aluminium-Zinc-Magnesium Alloys. An Examination of Their Tensile Properties and Oxy-Acetylene Welding Characteristics. W. I. Pumphrey. *Welding Research,* v. 7, Apr. 1953, p. 26r-33r.

Properties of typical welds were studied. Copper included in alloy impairs resistance to cracking. Tables, graphs, photographs. 19 ref. (K2, Q27, Al, Mg, Cu, Zn)

315-K. (French and German.) **Aluminothermic Welding of Aluminum Cables.** J. Bollinger. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 62-65.

New simple process for welding insulated Al cables to be laid underground. Photographs. 11 ref. (K4, Al)

316-K. (French and German.) **Regarding Actual Problems of Welding Research.** Carl G. Keel. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 62-75.

Weldability of high-C, alloyed, and high-alloy austenitic steels. Emphasizes diffusion process and describes electric-arc welding tests. Photographs, graphs, tables. 31 ref. (K9, K1, AY, CN)

317-K. (German.) **Testing of Welding Electrodes and Steels for Their Susceptibility to Weld-Seam Cracking.** Paul Werthebach. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 84-91.

Tests were made on various steels. Data are tabulated and discussed. 8 ref. (K9, ST)

318-K. (German.) **High-Frequency Overlapping in Electric-Arc Welding Process.** *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 76-78.

Parallel ignition apparatus, because of possible faulty connections, cannot be attached to every welding machine. Brown Boveri apparatus usable with a variety of machines. Diagrams. (K1)

319-K. (Russian.) **Effect of Impure Argon on the Quality of Argon-Arc Welding.** A. V. Petrov. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 5-8.

Results of investigation using Al alloys. Shows how basic impurities, O_2 and N_2, affect fusability. Suggests minimum purity limits. Diagrams, photographs. (K1, Al)

320-K. (Russian.) **Effectiveness of Heating Metals With an Oxy-Kerosene Mixture.** A. M. Glikshtern. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 13.

Describes advantages and compares it with oxy-acetylene heating. Oxy-kerosene was found to be more effective. Graphs. (K2)

321-K. (Russian.) **Use of Welding in Construction of the Volga-Don Canal and Other Communist Structures.** N. N. Rykalin. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 14-16.

Use of welding in construction of the canal and a hydroelectric power plant. Considers techniques, equipment, electrodes, and workmen. (K general)

322-K. (Russian.) **Facing Hydro-Turbine Blades.** I. R. Krianin, K. A. Udotov, L. M. Iarovinskii, and V. A. Lapidus. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 17-21.

Spot and butt welding of stainless steel plates to low-alloy turbine blades. Tests results for corrosion, cavitation, and corrosion-fatigue properties. Tables, photographs. (K3, R2, T25, SS, CN)

323-K. (Russian.) **Semi-Automatic Spot Welding Thin Sheet Structures At Right Angles.** M. R. Shraerman, B. G. Iungelson, and S. B. Petelina. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 21-24.

Use and advantages of regular and corner spot welding techniques. Graphs, tables. (K3)

324-K. (Russian.) **Multi Pass Submerged Arc Welding.** V. S. Volodin. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 26-28.

How increased production results. Tables. (K1)

325-K. (Russian.) **Progressive Welding Methods in the Zaporozhe Machinery Factory "Kommunar".** P. S. Volodin and S. E. Chernovol. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 28-30.

Advantages of automatic welding and operations involved. (K general)

326-K. Wrapped Lead Makes Solderless Connector. *Electrical Manufacturing,* v. 51, June 1953, p. 150-151.

Describes and illustrates process which produces a permanently tight joint between terminal lug and connecting wire. Photographs. (K13, Ti, Pb)

327-K. Mechanized Dip Soldering of Television Receivers. K. M. Lord. *Electronics,* v. 26, June 1953, p. 130-137.

Details of new electronic production technique built around a machine that solders 424 joints at once by dipping the inverted television chassis in a pool of molten solder. Similar dip-solder machines are used for radios. Photographs. (K7)

328-K. Recent Developments in the Industrial Application of Resistance Welding. H. E. Dixon. *Institute of Welding, Transactions,* v. 16, Apr. 1953, p. 27-37.

Most important developments in resistance welding processes during recent years; their application in industry. Diagrams. (K3)

329-K. Investigation Into the Fatigue Strength of Stud Welds as Compared With Normal Screwed Studs. F. Koenigsberger and Z. Garcia Martin. *Institute of Welding, Transactions,* v. 16, Apr. 1953, p. 39-44.

Results of investigation which showed that stud welds of sound quality produced carefully have a fatigue resistance which is lower than that of rolled threads but equal to that of machine-cut threads. (K1, Q7, CN)

330-K. 3 Ways to Boost Aluminum Welding Production. H. A. Huff, Jr. *Iron Age,* v. 171, June 4, 1953, p. 146-147.

Shows that change in shielding gas, adaptation of a machine for 2-torch operation, and use of thoriated W electrodes tripled production rate of Al case boxes. Photographs. (K1, K2, Al)

331-K. Assessment of Weldability by Rapid Dilatation Tests. C. L. M. Cottrell. *Iron and Steel Institute, Journal* v. 174, pt. 1, May 1953, p. 17-24.

Transformation characteristics of 34 experimental low-alloy steels were examined in a rapid dilatometer, using a thermal cycle similar to that occurring in a known welding test. Steels were the Mn-Ni-Cr-Mo type, some containing Cu. Method by which thermal cycle occurring in the heat-affected zone of a weld is simulated in a dilatometer specimen. Tables, graphs. 16 ref. (K9, M23, AY)

332-K. How Vapor Flux Brazing Produces Quality Joints. Harold S. Card. *Materials & Methods,* v. 37, June 1953, p. 120-122.

Results in bronze welds which meet all requirements for strength, soundness, tightness, and appearance. Diagrams, photographs. (K8)

333-K. Using Two New Machines, Hold-Down Studs Go in Two at a Time. *Railway Track and Structures,* v. 49, Mar. 1953, p. 270-271.

Tests with a tie-drilling machine and stud-driving rig for installing "Racor" studs as hold-down fastenings. Twin drills and twin hammers are pre-set for positioning tools over tie-plate hold-down holes on each side of the rail so that both positions are worked on simultaneously. Photographs. (K13)

334-K. What Savings From Butt-Welded Rail? *Railway Track and Structures,* v. 49, May 1953, p. 474-475.

Based on data received in reply to a questionnaire submitted to ten railroads which had installed an excess of two miles of welded track, exclusive of tunnels. Covers first cost, maintenance, life, and salvage value of both types of rail. Photographs. (K1, A4, A8, CN)

335-K. Welding Tools and Dies. Harold S. Card. *Tool Engineer,* v. 30, June 1953, p. 58-62.

How fusion welding is used to salvage and repair worn or damaged tools and dies. Photographs. (K general, A8)

336-K. Soldering on a Production Basis. Lester F. Spencer. *Welding Engineer,* v. 38, June 1953, p. 45-49.

Pb, Sn, Bi, and Sb soft soldering alloys; strength of joints; cleaning; fluxing; fluxing agents; hand or dip soldering; and soldering of stainless steels, Al alloys, Ni, Mg, Zn, and pewter. Photographs. (K7, Pb, Sn, Bi, Sb, Al, Ni, Zn, SS)

337-K. Welded Aids to Aid Your Welding. Lucien R. Greif. *Welding Engineer,* v. 38, June 1953, p. 54-55, 70.

Hints for making welding shop aids. Photographs, diagrams. (K general)

338-K. No Leakers in These Cylinders. *Welding Engineer,* v. 38, June 1953, p. 56-57, 64.

Use of W inert-gas welding techniques for joining SAE 4130 steel shells. Photographs. (K1, AY)

339-K. Challenge to Mixer Manufacturers. Fred M. Burt. *Welding Engineer,* v. 38, June 1953, p. 58-60, 64.

Weight of concrete mixers can be reduced by using weldments and eliminating heavy castings. Photographs. (K general)

340-K. Production Line for Office Furniture. C. A. Medsker. *Welding Engineer,* v. 38, June 1953, p. 62-64.

Combination of welding torch and spot welder to produce steel cabinets and desks of fine appearance and durability. Photographs. (K2, K3, ST)

341-K. Soldering Alloys and Some of Their Uses. *Welding Engineer,* v. 38, June 1953, p. 67.

Data sheet. (K7)

342-K. Recrystallization Welding. John M. Parks. *Welding Journal,* v. 32, May 1953, p. 209s-222s.

Shear strength of welds and principal factors controlling recrystallization in pressure welding. Basic relationship between recrystallization temperature and degree of deformation is derived and analyzed. Graphs, tables, photographs. 29 ref. (K5, N5, Al, Cu, Mg, Ni, Ag, Ti, CN)

343-K. Production Welding of Steels by Gas-Shielded Arc Welding. C. J.

Sullivan. *Welding Journal,* v. 32, May 1953, p. 391-396.

Production welding procedures of mild and low-alloy steels by gas-sielded arc have been developed to the stage where they are competitive in cost and quality with older methods. Graphs, tables, photographs. (K1, CN, AY)

344-K. Gases Produced by Inert Arc Welding. John J. Ferry and Gordon B. Ginther. *Welding Journal,* v. 32, May 1953, p. 396-398.

Investigation of formation of ozone and nitrogen oxides and decomposition of trichloro-ethylene vapor in the vicinity of the arc. Tables. 7 ref. (K1)

345-K. Automatic Field Welding of Girth Joints of Large Storage Tanks. Perry C. Arnold. *Welding Journal,* v. 32, May 1953, p. 399-406.

Details of a carriage for automatically making submerged-arc welds in a horizontal position. Tables, photographs. (K1)

346-K. The Inert-Gas-Shielded Metal-Arc Welding Process. W. H. Wooding. *Welding Journal,* v. 32, Apr. 1953, p. 299-312; May 1953, p. 407-423.

The process, operation of equipment, and characteristics of the arc. Graphs, diagrams, photographs. 5 ref. (K1, Al, Ni, Cu, SS)

347-K. (French.) The "Plurial" Process. M. Lebrun. *Revue Soudure,* v. 8, no. 4, 1952, p. 175-184.

A new multi-electrode process introduced in Belgium for use in fabricating "sandwich" panels. Present equipment is used. Tables. (K1, CN)

348-K. (German.) Strength of Synthetic-Resin-Glued Metallic Joints. K. Frey. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 33-39.

Describes numerous tests performed on simply overlapped light metal joints glued with "Araldite." Diagrams, graphs, tables. 7 ref. (K12, Q23)

349-K. Special Fixtures Eliminate Welding Stresses in Bus Bodies. Thomas MacNew. *Automotive Industries,* v. 108, June 1, 1953, p. 66-67.

Unique type of welding buck used in producing "Mack" buses to avoid welding stresses and to maintain true alignment of the parts within close limits. (K1, Q25)

350-K. Joining Metals by Cold Pressure Welding. *Canadian Metals,* v. 16, May 20, 1953, p. 42, 44-45.

Method of joining metals by pressure alone at ordinary temperatures. No special heat or chemical treatment is required and tools can be simple. Basic facts, applications, and limitations of the process. Photographs. (K5, Al)

351-K. Some Properties and Applications of Synthetic Resin Cements. V. Evans. *Chemistry & Industry,* May 23, 1953, p. 504-509.

Synthetic resin cements used in corrosion-resisting constructions. (K12, R general)

352-K. Inert Arc Process Minimizes Oxides in Welding of Copper. John D. Kelly. *Industry & Welding,* v. 26, June 1953, p. 51-54.

Shows that inert-gas shielded-arc welding has speeded up production and increased efficiency of operation in the manufacture of Cu pressure vessels. Use of the process has also entirely eliminated necessity for preheat in the welding of heavy sections. Photographs. (K1, Cu)

353-K. 73 Spot Welding Machines Solve Aircraft Production Problem. J. R. Fullerton. *Industry & Welding,* v. 26, June 1953, p. 56-58, 60, 62, 112, 114-118.

Equipment and materials used; how to choose proper equipment for resistance welding; metal classifications; problems in utilizing machines; and resistance welding accessories. Photographs. (K3, Al, Mg, Ti, Ni, SS)

354-K. Nickel-Base Electrodes Solve a "Shattering" Problem. *Industry & Welding,* v. 26, June 1953, p. 66-68, 119.

Materials and techniques used to repair heavy cast iron case in a road grader. Photographs. (K1, CI)

355-K. Multiple Electrode Welding Speeds Submerged Arc Process. *Industry & Welding,* v. 26, June 1953, p. 88-91.

Welding process for unique control of weld shape and unusually high speeds by using two or more electrodes in tandem, transverse, or other position. Photographs. (K1)

356-K. Use A-C Arc Welding to Install Pipe Lines in Chicago Stadium. William Murray. *Industry & Welding,* v. 26, June 1953, p. 108-110.

Materials and techniques used to install an air conditioning system and an ice-making machine. Photographs. (K1)

357-K. Welding for Low Temperatures. *Metal Progress,* v. 63, May 1953, p. 190, 192, 194-196.

Condensed by W. L. Warner from "Welding for Low-Temperature Service", by Robert W. Bennett, *Alco Products Review,* v. 2, Winter 1953, p. 4-15. Qualification of metals for service at subzero temperatures in unfired pressure vessels fabricated under the ASME code was deter-

mined by means of the standard Charpy keyhole notched bar. Testing procedure and results. (K9, Q6, Cu, Al, AY)

358-K. Thread Inserts Prevent Galvanic Action in Resistance Welding Guns. *Industry & Welding,* v. 26, June 1953, p. 131-132, 134.

Use of stainless steel wire thread inserts to prevent galvanic action between dissimilar metals in portable resistance welding guns. (K3, R1, Al, Cu, SS)

359-K. The Argonaut Welding Process. *Railway Gazette,* v. 98, May 22, 1953, p. 596.

Use of inert-gas shielded arc with consumable electrode and automatic regulation. (K1)

360-K. Pressure Welding Attracts Interest. Charles Bruno and George W. Birdsall. *Steel,* v. 132, June 8, 1953, p. 90-91.

Newest joining techniques for nonferrous metals. Work can be done cold or at elevated temperatures. Both techniques are still in the development stage but appear promising, particularly for Al and its alloys. (K5, Al, Cd, Cu, Ni, Zn, Ag)

361-K. Resistance Welding Shines as Volume Producer. Jack Ogden. *Steel,* v. 132, June 8, 1953, p. 92-94.

Versatility and the ability to tie in with automatic parts handling equipment. Spot welds are laid down quickly and are accurately spaced each time. Diagrams. (K3)

362-K. (German.) **Materials and Economy of Modern Gas-Envelope Welding.** A. Matting. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 227-234.

Use of He and Ar. Photographs, graphs, diagrams. 12 ref. (K1)

363-K. (German.) **Flow Temperatures of Ag-Cd-Cu-Zn Hard Solders.** K. M. Weigert. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 247-250.

Increase of temperature by adding Cd to Ag-rich Ag-Cu-Zn alloys can be linked with the inherent, higher flow temperatures of Ag-Cd-Cu system. Test results. Flow diagrams. 9 ref. (K7, Ag, Cd, Cu, Zn)

364-K. (German.) **Experiences in Oxy-Acetylene Pressure-Welding of Rails.** W. Hoffmann and W. Raabe. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 90-95.

Feasibility and economy of method for various steels. Photographs, graphs. (K2, CN)

365-K. (German.) **Thermit Method of Butt-Welding Rails.** Fritz Gessner. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 95-99.

Procedures and economies of three thermit processes. Photographs, diagrams. (K4, CN)

366-K. (German.) **Flash-Butt Welding of Rails and Cross-Ties.** Otto Wendt. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 99-104.

Procedures. Photographs, diagrams. (K3, CN)

367-K. (German.) **Oxy-Acetylene Rail Welding in the Railway System of an Iron Works.** Storcks. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 104-107.

Extensive use of oxy-acetylene welding. Photographs, diagrams, tables. (K2, CN)

368-K. (German.) **Oxy-Acetylene Rail Welding and Its Economy in Industrial and Private Railway Systems.** Ferd. Mieves. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 107-110.

Cost estimates and tabulated data. (K2, A4, CN)

369-K. (German.) **Regulations for Manual Oxy-Acetylene Welding of Thin Sheet Metal.** H. Killing. *Schweissen und Schneiden,* v. 5, no. 4, Apr. 1953, p. 143-145.

Procedures for welding thin ferrous and nonferrous sheet metals. Diagrams. (K2, CN)

370-K. (German.) **Welded Structures for Iron and Steel Works.** Friedrich Wilhelm Griese. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 556-567.

Influences which change stability and elastic behavior of structures. Service conditions and fabrication techniques are considered. Photographs, diagrams. 7 ref. (K general, Q21, Fe)

371-K. (German.) **Repair Welding in Iron and Steel Works.** Wilhelm Klapheck. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 568-572.

Savings gained by repair welding. Photographs. (K general, Fe)

372-K. (Swedish.) **The Most Common Welding Defects.** C. Hörnegren. *Svetsaren,* v. 17, no. 4, 1952, p. 43-50.

X-ray detection of pores, slag inclusions, fusion layers, and fissures. Photographs, diagrams. (K9, S13)

373-K. (Swedish.) **Advice on Future Uninterrupted Service of Sheet-Welding Machines.** Gustaf Gardtman. *Svetsaren,* v. 17, no. 4, 1952, p. 51-54.

Treatment and operation regarding procedure and layout of welding operation. Table is given which summarizes types, causes, and remedies of breakdowns. (K general)

374-K. (Swedish.) **Solution to Problem of Weld Repairing a Bridge of Steel 52.** Fritz Illing. *Svetsaren,* v. 17, no. 4, 1952, p. 55-56.

Arc welding of cracks. (K1, AY)

375-K. How Compressed Air Serves the Aircraft Industry. Edmond C.

Powers. *Aero Digest,* v. 66, June 1953, p. 26-27.
Riveting equipment, drills, and saws. Equipment is used in processing Al. (K13, Al)

376-K. New Welding Technique Cuts Maintenance Costs. C. W. Brett. *Glass,* v. 30, May 1953, p. 215-218.
Techniques for repairing and maintaining production equipment. Photographs. (K general, CN)

377-K. Automobile Radiator Cores Soldered in Convection Oven. Arthur Q. Smith. *Industrial Heating,* v. 20, June 1953, p. 1146, 1148.
Process. (K7, CN)

378-K. Soldering Aluminium. Recent Advances. *Light Metals,* v. 16, June 1953, p. 194.
New soft and hard solders for Al. (K7, Al)

379-K. Welding Restores Drill Collars. R. Sneddon. *Petroleum Engineer,* v. 25, June 1953, p. B16, B18.
Machine using an oxy-acetylene heater head which produces a perfect fusion of faces by "solid phase" welding. (K2, ST)

380-K. Notes on the Use of Rivets and Other Fasteners. R. Lowell Hand. *SAE Journal,* v. 61, June 1953, p. 41-43.
Variety of problems concerning use of flush and automatic riveting; stainless steel and blind rivets; shaving of rivet heads; leakproof fasteners; tolerances; drilling; and roll pins. (K13)

381-K. Welding Thin Sections to Thick Material. Robert Thomas. *Steel Processing,* v. 39, June 1953, p. 275-276, 303.
Arc welding galvanized and black iron sheet to heavy pipe connections. Photographs. (K1, CN)

382-K. Applying Resistance Welding to Production. I. Jones. *Welding and Metal Fabrication,* v. 21, June 1953, p. 192-196.
Process, machine, tools, and maintenance. Photographs. (K3)

383-K. D. C. Plants for Argon-Arc Welding. F. Hirschmann. *Welding and Metal Fabrication,* v. 21, June 1953, p. 201-204.
Advantages of the equipment for welding mild steel and Ni alloys. Photographs, diagrams. (K1, Ni, CN)

384-K. (French.) **Large Beams Welded at the Charles III Theater in Madrid.** J. Batanero. *Ossature Metallique,* v. 18, no. 5, May 1953, p. 271-276.
Beam construction. Diagrams. (K general, T26, CN)

385-K. (French.) **Welded Arches for Industrial Structures.** J. Meuret. *Ossature Metallique,* v. 18, no. 5, May 1953, p. 284-286.
Advantages resulting from the construction of a new hall. Discusses economy, dimensions, lighting, etc. Photographs, diagrams. (K general, T26, CN)

386-K. (French.) **Joint Research of the Research Institute of Iron Metallurgy and the Institute of Welding on the Weldability of Steels. I. Program and Distribution of Work.** G. Delbart and A. Leroy; **II. Improvements of the Kinzel Test. (Notch Bend Test.)** J. P. Videau and R. Quigna; **III. Comparison and Significance of the Tests.** H. Granjon and J. P. Videau. *Soudure et Techniques connexes,* v. 7, no. 3-4, Mar.-Apr. 1953, p. 67-82; disc. p. 82-85.
Graphs, diagrams, and micrographs. (K9, ST)

387-K. (French.) **Applications of Welding and Allied Processes in the Construction and Maintenance of the Railway Tracks of the French National Railways.** O. Leduc. *Soudure et Techniques connexes,* v. 7, no. 3-4, Mar.-Apr. 1953, p. 87-91.
Problem of long sections of welded rails. Photographs. (K general, T23, CN)

388-K. (French.) **Thermit Welding of Long Sections of Welded Rails and Various Applications of Thermit Welding.** C. Naffrechoux. *Soudure et Techniques connexes,* v. 7, no. 3-4, Mar.-Apr. 1953, p. 92-100.
Material used, experimental technique, operative methods, and results. Photographs, diagrams. (K4, T23, CN)

389-K. (German and French.) **Welding of Pressure-Pipe Lines.** A. Siegenthaler. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 5, May 1953, p. 100-101.
Procedure for difficult welding on compressed air pipes. (K general)

390-K. (German.) **Hard Brazing Aluminum.** E. Herrmann. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 139-150.
Solders, fluxes, and methods including torch, furnace, and dip brazing. Photographs, micrographs, diagrams. (K8, Al)

391-K. (German.) **Recent Research Results on Glued Light-Metal Joints.** K. Krekeler. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 151-161.
Specimen preparation, suitable testing methods, and the effects of surface conditions. Diagrams, photographs, tables, graphs. 36 ref. (K12, Al)

392-K. (German.) **Kupalu-Copper-Aluminum Welding Process.** A. Mühlinghaus. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 164-165.

Procedure and equipment for resistance welding Cu to Al. Illustrated. (K3, Cu, Al)

393-K. (German.) **Electric-Arc Welding of Load-Chain Links.** A. Buchholz. *Schweissen und Schneiden,* v. 5, no. 2, Feb. 1953, p. 66-70.

Procedures of repairing chains. Tensile strength of welded chain steel is reduced by normalizing. Photographs, diagrams, tables. (K1, Q23, CN)

394-K. (German.) **Welding Malleable Iron.** F. Roll. *Schweissen und Schneiden,* v. 5, no. 2, Feb. 1953, p. 70-74.

Differences between all-black, white, and black-core malleable irons. Specifications for welding these irons are tabulated. Photographs, graphs, tables. (K general, CI)

395-K. (German.) **Systematology of Welding Methods.** H. v. Neuenkirchen. *Schweissen und Schneiden,* v. 5, no. 2, Feb. 1953, p. 74-76.

Classification of welding methods by heat sources, protective agents, and "gaps". 7 ref. (K general)

396-K. (German.) **New Standards and Specifications on the Welding of Steam Boilers and Pressure Vessels.** W. Dörrscheidt. *Schweissen und Schneiden,* v. 5, no. 5, May 1953, p. 173-183.

Diagrams, tables, graphs, and photographs. 24 ref. (K general, S22)

397-K. (German.) **Reasons for Faulty Welded Seams by Continuous Resistance Butt Welding of Tubes.** Franz Bauernfeind. *Schweisstechnik,* v. 7, no. 2, Feb. 1953, p. 13-18.

Process from standpoint of steel production and its influence on welding, strip rolling, and preparation. (K3, CN, AY)

398-K. (German.) **Causes of Defective Weld Beads in Continuous Resistance Butt Welding of Tubes.** (Concluded.) Franz Bauernfeind. *Schweisstechnik,* v. 7, no. 3, Mar. 1953, p. 34-39.

Condition of material, welding equipment, and practice are shown to be possible sources of defects. Photographs, diagrams, photomicrographs, graphs. (K3, CN, AY)

399-K. (German.) **Filler Rods for Oxy-Acetylene Welding of Steel.** C. G. Keel. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 4, Apr. 1953, p. 113-133.

Tests of fillers having high notch impact strength. Surveys all important hardness and deformation properties of three fillers. Relationship between H_2 content and notch impact strength. Photographs, graphs, tables, diagrams. (To be continued.) (K2, Q6, ST)

400-K. (Hungarian.) **Construction of Rail Joints by Means of Seam Welding.** Janos Szemere. *Küzlekedéstudomanyi Szemle,* v. 3, no. 1, Jan. 1953, p. 29-32.

Methods for avoiding defects and prolonging fatigue limit. Diagrams. (K3, CN)

401-K. Welding Developments. A Review of the Methods Employed for Vauxhall Velox and Wyvern Bodies. *Automobile Engineers,* v. 43, June 1953, p. 247-257.

Equipment for welding automobile parts. Press welding. Photographs. (K general, CN)

402-K. Solderless Wrapped Connections. Introduction. J. W. McRae. **I. Structure and Tools.** R. F. Mallina. **II. Necessary Conditions for Obtaining a Permanent Connection.** W. P. Mason and T. F. Osmer. **III. Evaluation and Performance Tests.** R. H. Van Horn. *Bell System Technical Journal,* v. 32, May 1953, p. 523-610.

Graphs, diagrams, photographs. (K13)

403-K. Welding Quickly Restores Broken Turbine Blades. *Electric Light and Power,* v. 31, June 1953, p. 136-137.

Welding is less expensive and more rapid than replacement with new parts. (K general, AY)

404-K. Modern Pipe Welding Practices. F. C. Fantz. *Industry & Welding,* v. 26, Apr. 1953, p. 37-40, 72-73; May 1953, p. 74-76, 78-79; July 1953, p. 65-68, 70-71.

Advantages of welded structures in modern oil refinery equipment. Various types of pipe connections and flanged joints. Selection of pipe connections for separation of flow and reduction of line area. How welding is used to reinforce nozzle or branch connections and to protect butt-welded joints. Adaptation of submerged-arc method to pipe fabrication. Photographs. (K general, ST)

405-K. 17,680 Feet of Welding. Procedures for Fabricating All-Welded Gasholder. *Industry & Welding,* v. 26, July 1953, p. 33-36, 57.

Shows that all-welded structure is an outstanding example of the flexibility and speed offered to the field of structural fabrication by the arc-welding process. Construction and various types of welds. Diagrams. (K1, CN)

406-K. Unique Spot Welding Set-Up Used to Fabricate Wire Products. *Industry & Welding,* v. 26, July 1953, p. 50-51, 53-54, 56-57.

How the spot welders are used in production of display baskets, racks, and other products made from round wire. Photographs. (K3, ST)

407-K. Oxy-Acetylene Cutting Prepares Special Struts for Fabrication. Clement F. Brown. *Industry & Welding,* v. 26, July 1953, p. 81-82, 84.

Design and fabrication problems of an experimental job requiring two welded strut-type members of low-carbon steel to be used for aquatic application. (K2, G22, CN)

408-K. Flush Welds Withstand Impact Better Than Reinforced Welds. Carl E. Hartbower. *Iron Age,* v. 171, June 25, 1953. p. 136-139.

Investigation of performance of weldments over a wide temperature range and under combined load. Explosive bulge tests were used. (K9, Q6, CN)

409-K. Light Alloy Welding Demonstrated. *Metal Industry,* v. 82, June 5, 1953, p. 469.

"Argonaut" welding in which the W electrode of the argon-arc process is replaced by an Al filler wire which is automatically fed down the gun to the weld inside the protecting argon envelope. (K1, Al)

410-K. Welding Sequences and Uses of Heat. F. H. Dill. *Midwest Engineer,* v. 6, July 1953, p. 3, 11-13.

Welding shrinkage and use of heat to combat it. (K general, J general)

411-K. Welding Army Truck Mufflers. James P. Moss. *Modern Machine Shop,* v. 26, July 1953, p. 130-135.

Fully automatic machine makes hidden arc welds on elliptical ends after subassemblies are prepared by arc, seam, and spot welds on Al coated steel. Photographs. (K1, K2, K3, Al, ST)

412-K. Mass Production in Small Shops. Byron Russell. *Modern Machine Shop,* v. 26, July 1953, p. 136-142.

What can be done if proper consideration is given to all production angles. Use of homemade fixtures for welding and machining. Photographs. (K general, G17)

413-K. Future Problems to Be Faced in the Development of Metallic Arc Electrodes. J. H. Paterson. *Welder,* v. 22, Apr.-June 1953, p. 29-33.

Dilution of weld metal with parent metal; presence of trace elements; rate of solidification and cooling of weld metal; and the standard electrode. (K1)

414-K. The Influence of Lloyd's Register of Shipping on Welding Progress. H. N. Pemberton. *Welder,* v. 22, Apr.-June 1953, p. 38-39.

Part played in development and application of welding in shipbuilding and engineering. (K general)

415-K. The Welding of Equipment in Chromium-Nickel Austenitic Steel. F. H. Keating. *Welder,* v. 22, Apr.-June 1953, p. 61-69.

Development of sigma phase, reduction of corrosion resistance, reducing impact resistance at sub-zero temperatures, welding techniques, heat treatment, and finishing treatments. Micrographs. (K general, SS)

416-K. The Metallurgy of the Welding of Aluminium and Its Alloys. W. I. Pumphrey. *Welder,* v. 22, Apr.-June 1953, p. 70-79.

Study made of the metallurgy of fusion and pressure welding of Al and its alloys. Porosity and cracking are considered. Graphs. (K general, Al)

417-K. Atom Apple. Herman C. Phelps. *Welding Engineer,* v. 38, July 1953, p. 23-26.

Welding requirements demanded by a huge metal structure for atomic study. Photographs. (K general)

418-K. Ironwork Just Like New Orleans. T. B. Jeferson. *Welding Engineer,* v. 38, July 1953, p. 30-31.

Welding iron castings to form decorative iron work. Photographs. (K general CI)

419-K. Hosiptal for Sick Refrigerator Units. William C. Henzlik. *Welding Engineer,* v. 38, July 1953, p. 32-34.

Use of oxy-acetylene torches to cut and repair freezing units of refrigerators. Photographs. (K2, G22)

420-K. A Railroad Goes Into Car-Building Business. Clyde B. Clason. *Welding Engineer,* v. 38, July 1953, p. 44-47.

Fabrication of steel gondola cars by submerged-arc and manual arc welding. Photographs. (K1, CN)

421-K. Design of Welded Steel Bridges and Buildings. F. L. Plummer. *Welding Journal,* v. 32, June 1953, p. 489-496.

Advantages of welded construction, steel for welded structures, fabrication procedures, results of research, and examples of welded buildings. Photographs. (K general, T26, CN)

422-K. On the Welding of Titanium Alloys. C. B. Voldrich. *Welding Journal,* v. 32, June 1953, p. 497-515.

Properties, potentialities, and welding characteristics of Ti with a de-

scription of applicable processes. Photographs, graphs, micrographs. (K general, Ti)

423-K. Quality Control of Resistance Welding by Statistical Methods. J. F. Radford and R. K. Waldvogel. *Welding Journal,* v. 32, June 1953, p. 521-526.

Material derived from actual weld sampling is presented to give a case study of the manner in which data may be accumulated for introduction of a control program. Tables, graphs, photographs. (K3, S12)

424-K. Effect of Atmospheric Contaminants on Arc Welds in Titanium. J. C. Barrett, J. R. Lane, and R. W. Huber. *Welding Journal,* v. 32, June 1953, p. 283s-291s.

Effect of gaseous contaminants on the properties of arc welds in Ti. An attempt was made to determine the minimum content of each which would have a detrimental effect on the bend and tensile properties of the weld. Photographs, tables, micrographs. (K1, K9, Ti)

425-K. Strength and Trends of Bolted Assemblies. John S. Davey. *Agricultural Engineering,* v. 34, July 1953, p. 465-467, 471.

Proper use of bolted assemblies. Diagrams, graphs. (K13)

426-K. Availability and Adaptability of Fasteners. Fred C. Ewert. *Agricultural Engineering,* v. 34, July 1953, p. 468-471.

Recent developments, work accomplished by various standardizing bodies, how this work affects agricultural engineers, and fastener trends in the farm equipment industry. 5 ref. (K13)

427-K. Multitransformer Welding Presses. Jack Ogden. *Applications and Industry,* July 1953, p. 202-208.

Welding equipment and process considerations. Diagrams, graphs. (K5)

428-K. Welding Axle Housings in Automatic Machines L. E. Feeney. *Automotive Industries,* v. 109, July 1953, p. 54-55.

Operation of the machines. Photographs. (K1)

429-K. Step Ahead in Automation. Soldering 1000 Leads in One Mechanized Operation. K. M. Lord. *Factory Management and Maintenance,* v. 111, July 1953, p. 108-109.

Dip solder machine. Photographs. (K7)

430-K. Assuring Integrity of Welds in Storage Pipes With Complete X-Ray Inspection. H. P. Prudhomme. *Gas,* v. 29, July 1953, p. 36-38.

X-ray inspection methods and results. Tables, photographs. (K9, S13)

431-K. Watch Out for the "Hose Warts"! *Linde Tips,* v. 32, July 1953, p. 58-59.

Rules for keeping welding hose in good condition. (K2)

432-K. Hints for the Common Welding Jobs. *Linde Tips,* v. 32, July 1953, p. 64-65.

In tabular form. Photographs. (K general)

433-K. Bonding Rubber to Metal. *Modern Metals,* v. 9, July 1953, p. 44.

"Redux" process which employs a phenolic resin and a polyvinyl formal powder. Process can be applied to natural or synthetic rubber. (K11, Al)

434-K. Dripless Solderless Can. *Modern Packaging,* v. 26, July 1953, p. 88-89.

Can for "Lux Liquid Detergent" which features a dripless nozzle and cemented-side-seam. Material is lacquered blackplate. Photographs. (K12, L26, T29, ST)

435-K. Strength of Joints in Titanium Brazed With Several Alloys. L. W. Smith and L. A. Yerkovich. *Product Engineering,* v. 24, July 1953, p. 141-147.

Strength, stress-rupture, and fatigue properties of single and double lap joints of Ti sheet brazed with Ag and Al-base alloys. Both slow and rapid heating techniques were used. Tables, graphs. (K8, Q4, Q7, Q23, Ti, Ag, Al)

436-K. Correct Welding Procedure. I.-III. Lester F. Spencer. *Sheet Metal Worker,* v. 44, Dec. 1952, p. 36-38, 40; Feb. 1953, p. 59-62, 79; Mar. 1953, p. 74, 76-77; Apr. 1953, p. 70-72, 74, 76.

Part 1: Principal joint designs, types of projections, flash butt welding, alignment of surfaces, root openings, and pre and post heating. Part 2: Technique of welding and welding symbols. Part 3: Methods of welding; cause and prevention of poor welds; and welding medium and high-carbon steels. Diagrams, photographs, tables. (To be continued.) (K general, CN)

437-K. Large Coliseum Welded in Shop. *Steel,* v. 133, July 20, 1953, p. 143.

Use of semi-automatic hidden arc-welding outfits and shop jigs for welding structural steel components weighing 67 tons. (K1, T26, CN)

438-K. Oxyacetylene in Paper Mill Maintenance. Dorsey Blalock Thomas. *Tappi,* v. 36, July 1953, p. 38A, 40A, 42A, 44A.

Uses for oxy-acetylene welding and cutting in reclaiming materials, hard facing, and rebuilding production equipment. (K2, G21, L24)

439-K. A Modern Fabrication Shop. The South Works of Ashmore, Benson, Pease & Co. *Welding and Metal Fabrication,* v. 21, July 1953, p. 230-237.

Layout and expansion program. Welding equipment. Photographs, diagrams. (K general, A5)

440-K. Electrodes for Arc Welding Mild and Low Alloy High Tensile Steels. A. T. Roberts. *Welding and Metal Fabrication,* v. 21, July 1953, p. 245.

Description. (K1, CN, AY)

441-K. Applications of Koldwelding. W. A. Barnes. *Wire and Wire Products,* v. 28, July 1953, p. 671-674; disc., p. 719-722.

History of cold welding process and present applications. (K5, Al, Pt, Cu, Ag)

442-K. (Dutch.) **The "Extinction" in A.C. Electric-Arc Welding, Studied With the Aid of the Cathode-Ray Oscillograph.** K. K. Zwart. *Smit Mededelingen,* v. 8, no. 1, Jan-Mar. 1953, p. 22-25.

Part 2: Surveys factors influencing re-ignition and derives formulas to determine frequency of extinction. Graphs, diagrams. (K1)

443-K. (Spanish.) **Arc Welding, an Economic Factor in the Reconstruction of Streetcar Rolling Stock.** Luis Badias Aznar. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 6 p.

Series of welding jobs recently carried out in the reconstruction of streetcar units, with particular reference to the economic aspect. Photographs, tables. (K1, CN)

444-K. (Spanish.) **Influence of the Degree of Deoxidation and the Nitrogen Content of the Metal Deposited in the Arc Welding of Carbon Steels.** Jose Maria Sistiaga. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 22 p.

Chemical and metallographical study. Research methods and results. Micrographs, tables, diagrams. 48 ref. (K1, CN)

445-K. (Spanish.) **Proposed Standard Tests for Classifying Electrodes for the Electric-Arc Welding of Structural Steels.** *Ciencia y Technica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 6 p.

Purports to unify testing methods of above electrodes with respect to preparing test pieces, homogeneous impact tests, coating, and base metal. Diagrams, tables. (K1, CN)

446-K. (Spanish.) **Study of the Welding of a Cr-Mo Ferritic Steel Intended for a Transfer Line in Petroleum Refining.** M. de Miro Ramonacho and J. L. Zuloaga. *Ciencia y Tecnica de la Soldadura,* v. 2, no. 9, Nov.-Dec. 1952, 5 p.

Studies with respect to chemical analysis, electric-arc welding, metallographic examination, mechanical tests, and corrosion. Macro and micrographs. (K1, M general, Q general, R general, AY)

447-K. (Spanish.) **The Concept of Physical Metallurgy in Modern Welding.** L. Pottecher. *Ciencia y Tecnica de la Soldadura,* v. 3, no. 10, Jan.-Feb. 1953, 10 p.

The concept as an amplification of metallography due to new methods of study such as X-rays and α-rays, and the special case of welding processes. Diagrams. (K general)

448-K. (Spanish.) **Designs for Welded Constructions.** F. Koenigsberger. *Ciencia y Tecnica de la Soldadura,* v. 3, no. 10, Jan.-Feb. 1953, 8 p.

Advantages and limitations. Photographs, tables. (K general)

449-K. (Spanish.) **Electrowelded Structures.** R. Gil Alfaro. *Ciencia y Tecnica de la Soldadura,* v. 3, no. 10, Jan.-Feb. 1953, 8 p.

Construction, design, and fabrication by this process. Diagrams. (K6, CN)

450-K. (Spanish.) **Influence of the Addition of Titanium and Beryllium to the Deposited Metal in the Welding of Al-Mg Alloyed Metal Pieces Made by the "Argonarc" Process.** A. Revuelta. *Ciencia y Tecnica de la Soldadura,* v. 3, no. 10, Jan.-Feb. 1953, 20 p.

Prevention of a coarse columnar structure in Al alloys and oxidation of Mg in Mg alloys. Micrographs, tables. 14 ref. (K1, Ti, Be, Al, Mg)

451-K. (Spanish.) **Welding Text. I. Oxyacetylene Welding.** *Ciencia y Tecnica de la Soldadura,* v. 3, no. 10, Jan.-Feb. 1953, 14 p.

General study. Diagrams, tables. (K2)

452-K. (Book.) **WelDesign Manual.** Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio. $10.

Design system. Data, charts, nomographs, tables, cost calculator, process selection guides, and time charts instructions for using the manual for study; cost calculator slide rule; and a set of weld standards are included. (K general)

453-K. (Book.) **Welding Review Year Book, 1953.** J. V. Brittain, editor. 309 p. Engineering Trader Ltd., Morley House, 26-30 Holborn Viaduct, London, E.C.1, England. 10s. post net.

Techniques, equipment, and materials. (K general)

454-K. (Book.) **Welding Technology. Ed. 2.** F. Koenigsberger. 341 p. 1953. Cleaver-Hume Press Ltd., 42a South Audley St. London, W.1, England. 25s.

Surveys welding processes, their characteristics and equipment. (K general)

455-K. Welding Copper and Copper Alloys. Warren Coulter. *Canadian Metals,* v. 16, June 1953, p. 52, 54; July 1953, p. 34, 36.

Part I: Problems met in welding Cu, allowances for properties, and methods of welding including oxyacetylene, electric arc, and metallic arc. Part II: W arc shielded with inert gas, cold working, and importance of P. Photographs. (K2, K1, Cu, W, P)

456-K. Procedures for Welded Construction of Special Machinery Frames. *Industry & Welding,* v. 26, Aug. 1953, p. 37-40.

Pressures, amperage edge preparation, choice of electrodes, and design of positioners. Photographs. (K1, CN)

457-K. Nickel-Molybdenum Welding Repairs Defects in New Casting. *Industry & Welding,* v. 26, Aug. 1953, p. 42.

Procedure. Photographs. (K general, Ni, Mo)

458-K. Inert Arc Weld High Carbon Steel With Stainless Filler Wire. *Industry & Welding,* v. 26, Aug. 1953, p. 53, 79.

Process. Photographs. (K1, CN)

459-K. You Can Use Furnace Brazing for Ductile, High Strength Joints. L. Jacobsmeyer. *Industry & Welding,* v. 26, Aug. 1953, p. 54-56, 58.

Cu and Ag brazing. Photographs, diagrams, photomicrographs. (K8, Cu, Ag)

460-K. Up-to-Date Comparison Chart for Low Hydrogen Electrodes. *Industry & Welding,* v. 26, Aug. 1953, p. 60-61.

Comparative information on low-hydrogen electrodes now available. Table. (K1, Ni, Mo, Mn, V)

461-K. Oxy-Acetylene Welding Pays Dividends in Mill Maintenance Work. *Industry & Welding,* v. 26, Aug. 1953, p. 62-64, 66, 68-69.

Equipment and use of oxy-acetylene welding. Photographs. (K2)

462-K. Resistance Welding Cuts Tooling Costs 75 Percent. *Industry & Welding,* v. 26, Aug. 1953, p. 71-72, 74-75.

Savings; use for unusual appliances; elimination of custom tooling; and use of standard dies, assemblies and visual inspection. Photographs. (K3)

463-K. Short Cuts to Increased Shop Welding Efficiency. *Industry & Welding,* v. 26, Aug. 1953, p. 84-86, 88-89.

Photographs. (K general)

464-K. Welding Speed Quadrupled With Semiautomatic Methods. *Iron Age,* v. 172, July 30, 1953, p. 102-104.

Semi-automatic hidden arc welding methods, combined with welding positioners and turning rolls. Photographs. (K1)

465-K. Good Fixtures Expedite Arc Welding of Heavy Assemblies. William T. Potter. *Machine and Tool Blue Book,* v. 49, Aug. 1953, p. 155-160.

Features and advantages of welding fixtures. Photographs. (K1)

466-K. Modern Furnace Brazing Practice. I.-II. H. M. Webber. *Machine and Tool Blue Book,* v. 49, July 1953, p. 160-168, 172-173; Aug. 1953, p. 192-194, 196, 198, 200-206.

Principles and applications as well as comparative tests between brazing and machining given parts. Diagrams, photographs. 16 ref. (K8, G17)

467-K. Repairs to Blading of a Large Ventilating Fan. J. H. Dent. *Machinery Lloyd (Overseas Ed.),* v. 25, July 18, 1953, p. 90-92.

Cause of fracture and welding repairs. (K general)

468-K. Precision Spot Welding Machine. *Machinery Lloyd (Overseas Ed.),* v. 25, July 18, 1953, p. 101-102.

Equipment with respect to moveable electrode, welding pressure and timing. (K3)

469-K. Applying Welding to Ship Repairs. Sydney Swan. *Marine Engineering,* v. 58, Aug. 1953, p. 65-68.

Fracture problem, quality control, correct welding sequence and use of preheat. (K general, CN)

470-K. Brazing and Hard Soldering. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 312.

General brazing materials. Diagram. (K8, K7, Cu, Zn, Ag, Ni)

471-K. Brazing Cemented Carbide Tips. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 315.

Method. Diagram. (K8)

472-K. Fully Mechanized Welding. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 324-325.

Machines used to increase production. Photographs. (K general)

473-K. Cylinder Head-Barrel Built Up by Welding Four Components. *Metal Working,* v. 9, Aug. 1953, p. 4-5.

How cast, forged and wrought steel elements are assembled to form parts for light marine diesel engine. Photographs. (K general, ST)

474-K. High Speed Welding of Non-Ferrous Tubing. *Modern Machine Shop,* v. 26, Aug. 1953, p. 210, 212, 214.

Method of induction welding. Photographs. (K6)

475-K. Inert Gas Doubly Shields Improved Pipe Welds. *Power,* v. 97, Aug. 1953, p. 94-97.

"K-Weld Process" which uses inert-gas shielded-arc welding to apply the initial bead. Same process, metal arc, or any acceptable fusion welding method, may be used to finish. Photographs. (K1)

476-K. Tanks Ride Rocking-Horse Weld Positioner. *Steel,* v. 133, Aug. 3, 1953, p. 140.

Operation of a rocking positioner for welders' use. Photographs. (K general)

477-K. Factors in the Selection of Welding Processes. John J. Chyle. *Welding Journal,* v. 32, July 1953, p. 585-596.

Use of eight welding processes and their characteristics. Tables, diagrams, photomicrographs. (K general)

478-K. Cone Arc Welding. P. Patriarca and G. M. Slaughter. *Welding Journal,* v. 32, July 1953, p. 597-602.

Evaluates the process by experiment. Diagram, photographs, photomacrographs. 5 ref. (K1, SS)

479-K. Resistance Welding Applications in Aircraft Stainless Steels. D. O. Samuelson. *Welding Journal,* v. 32, July 1953, p. 603-611.

Specific application of spot and seam welding to assemblies for airframe parts and engines. Information on equipment controls and procedures. Tables, photographs. (K3, SS)

480-K. Welding Design for High-Pressure Gas Compressor Bottles. Carl Wurgler. *Welding Journal,* v. 32, July 1953, p. 612-613.

Design to reduce pipe failures. Diagrams. (K general)

481-K. Provide for Expansion and Contraction. J. A. Fluharty. *Welding Journal,* v. 32, July 1953, p. 620-621.

In respect to welding. Diagrams, photographs. (K general, P11)

482-K. Welding Time on Minesweeper Stacks Cut in Half. *Welding Journal,* v. 32, July 1953, p. 624.

Technique. Photographs. (K general, Al, SS)

483-K. Joining of Copper by Use of Heliwelding. H. A. Huff, Jr. *Welding Journal,* v. 32, July 1953, p. 625-626.

Advantages. Photographs. (K1, Cu)

484-K. Rotating Electrode. *Welding Journal,* v. 32, July 1953, p. 630.

Apparatus and operations. Photograph. (K1, Cu)

485-K. Stud Welding Used in Farm Machinery. *Welding Journal,* v. 32, July 1953, p. 631-632.

Photographs. (K1)

486-K. Protect the Part During Welding. E. E. Olson. *Welding Journal,* v. 32, July 1953, p. 632.

Use of carbon back-ups as welding aid. Photographs. (K1)

487-K. Considerations of Welded Hatch Corner Design. *Welding Journal,* v. 32, July 1953, p. 316S-324S.

Hatch corner details, tests, and design principles. Diagrams. (K general)

488-K. Structural Failures in Welded Ships. *Welding Journal,* v. 32, July 1953, p. 342S-346S.

Critical role of brittleness of steel. Diagrams, photographs, tables. (K general, Q23, CN)

489-K. Copper in Type 347 Weld Metal. R. P. Wentworth. *Welding Journal,* v. 32, July 1953, p. 347S-351S.

Experiments on the suppression of sigma phase by Cu additions. Tables, graphs. (K general, Cu, SS)

490-K. The New Bridge Over the Rhine at Dusseldorf. *Welding Journal,* v. 32, July 1953, p. 352S.

Specifications for weld joints in shop fabrication. Diagrams. (K1, T26)

491-K. (Russian.) **Production of Welded Bridges.** D. P. Lebed. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 6-9.

Principles of welded bridge construction. Diagrams. 4 ref. (K general, T26, ST)

492-K. (Russian.) **Transfer of Manganese Into Molten Metal During Manual Electric Arc Welding.** E. D. Lonskii. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 9-13.

Granulometric composition of ferromanganese introduced into the coating may play an essential role in the transfer and chemical composition of the molten metal. Tables. (K1, Mn)

493-K. (Russian.) **New Methods of Depositing Copper and Copper Alloys.** N. M. Cuelnokov. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 15-17.

Automatic carbon-metallic arc welding using rods and crushed chips. Diagrams, photographs. (K1, Cu)

494-K. (Russian.) **Problem of Welding With a Cluster of Electrodes.** N. Iu. Pal'chuk, N. I. Makarov, M. G. Makeev, N. V. Brodovick, and M. I.

Liber. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 24-32.

Optimum current and amount of weld material is smaller than for a single electrode. Quality of bead is the same. (K1, ST)

495-K. (Russian.) **Strength of Spots and Electro-Rivets During Welding of NL-2 and St. 3 Steels.** A. V. Obukhov, M. M. Kraichik, and E. A. Greil. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 7-10.

Advantages of using submerged arc electro-riveting. Photographs, diagrams, graphs, tables. 2 ref. (K1)

496-K. (Russian.) **Calculation of the Magnetic Circuit of Spot Welding Machine at a Given Value of Power.** O. N. Bratkova. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 10-12.

Magnetic circuit of a welding transformer for a given amount of energy. Graphs. (K3)

497-K. (Russian.) **Spot Welding of Aluminum Alloys by Means of an Apparatus Which Utilizes Accumulated Kinetic Energy.** S. V. Shablygin and B. V. Zhuravlev. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 12-14.

Expediency of welding Al alloys with a motor-generator apparatus. Experimental data. Photographs, graphs. 2 ref. (K3)

498-K. (Russian.) **Method of Welding Using Submerged Arc Electro-Riveting With Electrode Feeder.** N. I. Kakhovskii. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 18-22.

Considered to be very economical and to guarantee high durability. Graphs, tables, photographs, diagrams. 5 ref. (K1, CN)

499-K. (Russian.) **Machine for Automatic Welding.** I. V. Voronin. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 22-24.

For building of excavator, road, chemical and transport machinery. Diagrams, photographs. (K1)

500-K. (Russian.) **Reconditioning Cylinders of Horizontal Ammonia Compressors.** K. Voshchanov. *Khodil'naia Tekhnika,* v. 29, no. 3, July-Sept. 1952, p. 24-28.

Welding of cracks in valve cross connections of compressors. Diagrams. (K general)

501-K. (Russian.) **Facilitating the Forming of Shells During the Manufacture of Cylindrical Containers.** S. A. Starikovich and Z. B. Knizhnik. *Promyshlennaia Energetika,* v. 9, no. 10, Oct. 1952, p. 17-19.

Fixture to aid in the arc welding of steel cotnainers. (K1, ST)

502-K. (Spanish.) **Characteristics Necessary for Cables Used in Electric-Arc Welding.** *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 3 p.

Development of standards for welder cables. Tables. (K1)

503-K. (Spanish.) **Designing Welded Constructions.** F. Koenigsberger. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 12 p.

Mechanical properties of welded materials, economy in welding shop and welded joints and their strength. Diagrams, graphs, tables. (K general, Q general)

504-K. (Spanish.) **Remarks on the Study of Fluxes.** G. M. Blanc and B. H. Deglon. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 8 p.

Welding fluxes with respect to reduction and dissolution of oxides, melting point, density, viscosity, surface tension, solidification and other properties. 28 ref. (K1)

505-K. (Spanish.) **Repairing an 86-Hp. Diesel Motor by Welding.** D. F. Saceda. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 2 p.

Welding a defective cylinder head. Diagrams. (K general)

506-K. (Spanish.) **System of Longitudinal Structure With Lapboards for the Construction of Welded Hulls.** F. J. Bembibre. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 16 p.

Method of constructing ship hulls using welding as the principal method of joining which results in savings in materials and costs. Diagrams, tables. (K general, T22)

507-K. (Spanish.) **The Weldability of Copper.** M. Miro Ramonacho and A. Ruiz Rubio. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 8 p.

Physical-chemical processes that occur when metal is subjected to heat. Photographs, tables, graphs. (K9, Cu)

508-K. Nonferrous Tubing Smashes Speed Barrier. *Steel,* v. 133, Aug. 10, 1953, p. 146-148.

Process of high-speed induction welding. Diagram, photographs. (K6)

509-K. Ordinary Carbon or Low-Alloy Carbon-Manganese Structural Steels. *Institute of Welding, Transactions,* v. 16, June 1953, p. 77-79.

Minimum requirements for steels to be welded. (K9, CN, AY)

510-K. (French.) **Welded Frames for Machine Tools.** *Métallurgie et la Construction Mécanique,* v. 85, no. 4, Apr. 1953, p. 291, 293.

Recent progress in above field. Photographs. (K general, ST)

511-K. (French.) **Scientific Problem of Welded Joints.** F. Campus. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May, 1953, p. 213-217.

Studies particularly difficult welds. Formulas on the total shrinkage of butt welded joints. Weldability and brittle fracture with respect to the problem of fusion. 4 ref. (K9, Q26)

512-K. (French.) **Welding at the Service of the National Economy.** P. Goldschmidt. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 218-263.

Contribution of welding and associated techniques to the Belgium National economy as an element in production and construction. Photographs. (K general)

513-K. (French.) **Most Recent Progress in Resistance Welding.** A. C. Boland. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 263-268.

Progress in spot welding machines. Includes electrostatic and electromagnetic energy accumulation, frequency transfer, and d.c. and 3-phase machines. Diagrams. (K3)

514-K. (French.) **Results Produced With Bare Electrodes.** Willy Bonhomme. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 268-277.

Bare electrodes for arc welding with respect to technological and economical properties. (K1)

515-K. (French.) **Recent Progress in Welding, Repair, and Electric Arc Cutting.** F. Danhier. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 277-286.

Principal types of modern electrodes for steels and nonferrous metals. Includes automatic and oxyacetylene welding. Photographs, charts.
(K1, K2, Ni, Cu, Cr, CN, AY, SS)

516-K. (French.) **Recent Progress in Blow Torch Welding, Oxy-Acetylene Welding, and Some Associated Techniques.** T. Courard. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 287-300.

Principal postwar advancements. Tables, diagrams, photographs. (K2)

517-K. (French.) **Inert-Gas Arc Welding.** S. H. M. Pirard. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 300-311.

Use of A arc for W electrode, fusible electrode and spot welding processes. (K1, K3)

518-K. (French.) **Determining Weld Dimensions in Naval Construction.** H. E. Jaeger. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 312-319.

Indications for calculating strength of welded joints in naval construction with the creep limit being taken as a basis. Residual stresses. Tables, charts. 13 ref. (K9, Q3)

519-K. (French.) **Some Belgian Applications of Automatic Arc Welding.** P. de Marneffe. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 320-336.

Research on electrode coatings regarding protection of the arc against air, increase of penetration, and heavier metallic deposition. Diagrams, photographs. (K1)

520-K. (French.) **Drawing Up, Execution, and Inspection of Welded Structures.** H. Louis. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 336-356.

General study. Diagrams, photographs. (K general, S general)

521-K. (French.) **Reduction of Cost of Welded Construction.** F. Guyot. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 357-367.

Cost factors of construction made up principally for curved and flat sheets. Each class is analyzed with respect to operational methods, tools and difficulties inherent to the rough state of materials used. (K general)

522-K. (French.) **Metallurgical Aspects of Welding Problems.** Albert Portevin. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 375-383.

Special structure of the crater action of hydrogen, structural changes due to the welding thermal cycle, and problem of brittle fracture. (K9, Q26, ST)

523-K. (German.) **Present Status of Riveting in Light-Metal Structures.** E. W. Pleines. *Aluminium,* v. 29, no. 6, June 1953, p. 256-260.

Cold-hammered rivets, riveting compounds and techniques employed. British experience with large rivets in light metal structures. Tables, photographs, diagrams. 4 ref. (K13, A1)

524-K. (German.) **Welding and Cutting Technique.** K. Becker. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 590-592.

Modern equipment for welding and flame cutting. Photographs. 70 ref. (K general, G22)

525-K. (Hungarian.) **Present Problems of Improving Cast Iron.** Andras Pintér. *Ontöde,* v. 4, no. 4, Apr. 1953, p. 86-91.

Author's and Soviet experiences for repairing defective castings by

various surface treatments, welding, and metal spraying. Diagrams, tables. (K general, L23, CI)

526-K. The Properties of the Inert-Gas Shields in Welding. J. G. Solomon. *Australasian Engineer,* May 7, 1953, p. 56-62.

Paper presented before Sydney Branch, Australasian Welding Institute, Sept. 1952. Properties of the shields produced by H, He and A. Photographs, diagrams. 20 ref. (K1)

527-K. Welded Light Alloy Yacht. *Engineer,* v. 196, July 31, 1953, p. 138-139.

Use of argon-arc process. Photographs. (K1, Al)

528-K. Modern Practice in the Welding of Pipes. Background and Present Trends. E. Fuchs and A. J. P. Tucker. *Institute of Welding, Transactions,* v. 16, June 1953, p. 63-73.

Shows that the adoption of correct technique and application of a sound testing procedure make possible the production of high-quality butt welds in mild steel pipes. Application of the argon-arc process to the welding of 18-8 and 3% Cr-Mo piping. Photographs, diagrams, tables. 9 ref. (K1, SS, AY, CN)

529-K. Resistance Welding and Its Use in Aircraft Construction. Thomas A. Dickinson. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 661-664.

Photographs. (K3)

530-K. Brazing Tips for Flexible Hose. James R. Summer. *Steel,* v. 133, Aug. 10, 1953, p. 99-100.

Advantages and proper use of Ag brazing. Photographs. (K8, Ag)

531-K. What Goes Into a Welding Electrode? I. D. L. Mathias. *Welding Engineer,* v. 38, Aug. 1953, p. 27-30, 61-62.

Electrode design and formulation. Graphs, photographs. (To be continued.) (K1)

532-K. Sky Tower for Sky Harbor. T. B. Jefferson. *Welding Engineer,* v. 38, Aug. 1953, p. 36-37.

Control tower of welded steel construction. Shop fabrication and field erection. Photographs. (K general, T26, ST)

533-K. Arc Length. Current. Voltage. I.-II. Bruce L. Baird. *Welding Engineer,* v. 38, July 1953, p. 38-41, 43; Aug. 1953, p. 39-41.

Part I: Fundamentals of relays, transformers, autotransformers, electric motors and generators. Part II: What to do about an unstable arc, automatic welding flux, drive-roll pressure, and problems encountered when automatic welding is done on cylindrical workpieces. Diagrams. (K1)

534-K. Vital Tools for Vital Maintenance Jobs. Walter E. Schaefer. *Welding Engineer,* v. 38, Aug. 1953, p. 42-45.

Abstract of paper given at the International Acetylene Assoc., Atlanta, Ga., Apr. 13-15, 1952. Emphasizes importance of the oxy-acetylene flame in steel mill maintenance. Photographs. (K2)

535-K. Farm Implements Tailored to Fit. Thomas A. Dickinson. *Welding Engineer,* v. 38, Aug. 1953, p. 46-47.

Use of welding techniques to alter or rebuild standardized farm implements to meet specialized needs. Oxy-acetylene cutting torches and arc welding equipment. Photographs. (K2, K1)

536-K. Specifications for Brazing Filler Metal. AWS-ASTM Specification B260-52T. *Welding Engineer,* v. 38, Aug. 1953, p. 51.

Tabulated information for Al-Si, Cu, Cu-Zn, Cu-P, Mg, Ag, and Cu-Au. (K8, S22, Al, Cu, Zn, Mg, Ag, Au)

537-K. Metal-Arc Welding of Thick Aluminium-5% Magnesium Plate. W. G. Hull, P. T. Houldcroft, and J. D. Chadwick. *Welding Research,* v. 7, June 1953, p. 59-64.

Causes of low weld strength. Tables, photographs. (K1, Al)

538-K. Gaseous Additions to the Argon Shield in Welding Aluminium. D. C. Moore. *Welding Research,* v. 7, June 1953, p. 68-74.

Experimental work and results. Photographs, diagram, table. (K1, Al)

539-K. (French.) **Suggestions for a Classification of Welding Tests.** H. Granjon. *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, suppl. p. 1-13.

Diagrams, tables. 5 ref. (K9)

540-K. (French.) **Metallic Bridge Constructions With Special Consideration to Welding Techniques.** K. Lange. *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, p. 67-77.

German practice. Table, diagrams. (K general, T26, ST)

541-K. (French.) **Recommendations Worked Out by the No. 9 Commission (Weldability) of International Institute of Welding.** *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, p. 83-87.

Minimum requirements for C or low-Mn structural steels for arc welding. Tables. (K1, ST, AY)

542-K. (French.) **Spot Welding of Semi-Hard, Low-Alloy Steel. Suggestions Concerning a Definition of a Good Weld and Electronic Control of Welding Machines.** P. Joumat. *Soudure et Techniques Connexes,* v. 7, nos. 5-6, May-June 1953, p. 113-128; disc., p. 128-130.

Production and testing methods. Tables, photographs, diagrams. (K3, AY)

543-K. (French.) **Welded Construction of Electric Locomotives.** P. Formaget. *Soudure et Techniques Connexes*, v. 7, nos. 5-6, May-June 1953, p. 131-141; disc., p. 141-144.

Lists 18 suggestions applicable to a particular case. Production details of two types of locomotive chassis in service. Diagrams, photographs. (K general, T23, ST)

544-K. (Book.) **Electric Arc and Oxy-Acetylene Welding. Ed. 4.** E. A. Atkins and A. G. Walker. 352 p. Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, London, W.C.2, England. 30s.

Subjects covered include preparation of joints; metal cutting by electric arc and gas; effects of thermal expansion and contraction; weld defects and their detection; and welding of various metals and alloys. Information on the training of welders; regulations and specifications; and safety precautions to be observed. (K1, K2)

545-K. (Book.) **Welding Aluminum.** 186 p. Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.

Comprehensive review of welding methods for Al and alloys. Illustrations, tables. (K general, Al)

546-K. (Book—German.) **(Welding Design.) Schweisstechnische Berechnungen** Ernst Klosse. 64 p. 1951. Springer-Verlag, Berlin, Germany.

Problems of electric and gas welding. Discusses strength of materials in an elementary way. (K1, K2)

547-K. (Book—Russian.) **(Information Material for Welders.) Spravochnye Materialy dlia Svarchchikov.** 1951. Mashgiz, Moscow, Russia.

The practical side of the book is reflected by studies drawn from factories, laboratories, institutes, etc., but, technically, it is obsolete. (K general)

548-K. Controlled Internal-Contour Shielded-Root Welds Without Backing Rings. Charles Diehl, H. S. Blumberg, and W. G. Benz, Jr. *ASME, Transactions*, v. 75, Aug. 1953, p. 1103-1110; disc., p. 1110-1115.

"K-Weld" process. Diagram, photographs. (K1)

549-K. Research Findings on Brazing and Soldering Titanium. H. L. Meredith. *Automotive Industries*, v. 109, Aug. 15, 1953, p. 34-37, 152.

Brazing, soldering, induction brazing, filler metal alloying characteristics and heliarc brazing. Photographs, micrographs. (K8, K7, Ti)

550-K. Fast Roll-Spot Technique Doubles Welding Speeds. J. R. Fullerton. *Automotive Industries*, v. 109, Aug. 15, 1953, p. 46-47, 98.

New technique and equipment for welding stainless steel, Inconel "X" and "W", Haynes Stellite No. 25, and other crack-sensitive alloys. Micrographs. (K3, Ni, Co, SS)

551-K. Welding for Refrigeration. *Canadian Metals*, v. 16, Aug. 1953, p. 41.

New production welding techniques to make refrigeration condensing units two-thirds present size. Photographs. (K general)

552-K. Failures in Welded Bridges. *Canadian Metals*, v. 16, Aug. 1953, p. 48, 50.

Review of information on the weldability of steel by the National Research Council, Ottawa. (K9, ST)

553-K. On the Research of Welding and Welding Rod for Cast Iron. I. The Investigation of Commercial Welding-Rod for Cast Iron. Kiyoshi Yokota and Sukeharu Eto. *Castings Research Laboratory, Report*, no. 4, 1953, p. 60-62.

Table, graph, photomicrograph. (K9, CI)

554-K. Welding Research Leads the Way Toward Stronger, More Economical Structures. La Motte Grover. *Civil Engineering*, v. 23, Aug. 1953, p. 29-33, 95.

Condensed from paper presented at joint session of ASCE Structural Div. and AWS in Chicago. Structural welding processes, impact tests of welded beams, effect of coped holes in web and plastic analysis in design. Photographs, diagrams. (K general, K9, Q6, Q25)

555-K. Resistance Welding Builds Stronger, Lighter Auto Bodies. *Industry & Welding*, v. 26, Sept. 1953, p. 31-34, 72-73.

Welding operations. Photographs. (K3)

556-K. Skipwelding Minimizes Distortion in Heavy Weldments. *Industry & Welding*, v. 26, Sept. 1953, p. 40-42, 94-95.

Manual arc welding. Photographs. (K1)

557-K. Maintenance Welding Reduces Downtime for Food Processing Firm. *Industry & Welding*, v. 26, Sept. 1953, p. 45-46.

Various welding processes and strict quality control. Photographs. (K general)

558-K. Positioning for Downhand Welding Cuts Fabrication Time 30 Percent. *Industry & Welding*, v. 26, Sept. 1953, p. 48, 71.

Equipment. Photographs. (K general)

559-K. Don't Bargain With Arc Welding Booby Traps. *Industry & Welding,* v. 26, Sept. 1953, p. 52-54, 96-97.

Safety devices and operations. (K1)

560-K. Efficient Use of Welding Fittings Speeds Pipe Fabrication. C. F. Brown. *Industry & Welding,* v. 26, Sept. 1953, p. 65-68, 70.

Fittings and assemblies. Diagrams. (K general)

561-K. Flash Welding and High Speed Cold Reduction of Strip Steel for Tin Plate. John Wargo and Ray C. Brunner. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 59-64.

Equipment and techniques. Graphs photographs. (K3, F23, CN)

562-K. Electrodes for Welding Mild Steel. *Machinery Lloyd (Overseas Ed.)* v. 25, Aug. 1953, p. 106-108.

New Quasi-Arc electrodes. Weld metal, procedure and high-arc voltage. Photographs. (K1, CN)

563-K. Flash Welding of Railway Rails. Reinhold Keuhnel. *Metal Progress,* v. 64, July 1953, p. 138, 140, 142.

Translated and condensed from "Electrical Resistance Flash Welding of Railway Rails", *Stahl und Eisen,* v. 72, Oct. 23, 1952, p. 1346-1348. (K3, CN)

564-K. "Elastic Reserve" Is Key to Wrapped Wire-Terminal Joints. A. H. Allen. *Metal Progress,* v. 64, July 1953, p. 161, 164, 166, 168, 170, 172, 174.

Review by Bell Telephone Laboratory engineers on design, analysis and tests of solderless wrapped connections. Photographs, tables. (K12, Cu)

565-K. Aluminum Sheet Metal Practice in the Building Industry. *Modern Metals,* v. 9, May 1953, p. 28-30, 32-37; June 1953, p. 58-64; July 1953, p. 34-35, 37-38, 40; Aug. 1953, p. 67-73.

Part I: Fabricating practices and joining techniques including welding, brazing and soldering. Part II: Installation of batten-seam roofs. Part III: Installation details for standing and flat-seam roofs. Part IV: Installation procedures for corrugated and ribbed roofing and siding. Diagrams. (K general, A1)

566-K. Correct Welding Procedure. IV. Lester F. Spencer. *Sheet Metal Worker,* v. 44, June 1953, p. 63, 65-66; Aug. 1953, p. 102-103, 107.

Welding of coated metals such as aluminized and galvanized steel, terne and tin plate and plated steels. Photographs. (K general, ST)

567-K. High-Speed Automatic Projection Welding. C. E. Slade. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 281-285.

Describes and illustrates the equipment. (K3)

568-K. Brazing by Induction. D. Warburton-Brown. *Welding and Metal Fabrication,* v. 21, July 1953, p. 238-241; Aug. 1953, p. 291-295.

Part I: Compares induction brazing with torch, furnace, dip, resistance and salt bath brazing. Part II: Brazing of tool tips, filler caps to containers, refrigerator components, steering column assemblies and stainless steel parts. Photographs, diagrams. (K8, Cu, Ag, SS)

569-K. Aluminium Alloy Yacht of Welded Construction. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 298-300.

Arc welding techniques. Photographs. (K1, A1)

570-K. Inert-Gas Metal-Arc Welding of Mild and Low-Alloy Steel. Frank G. Harkins. *Welding Journal,* v. 32, Aug. 1953, p. 683-689.

Presented at Western Metal Congress, Los Angeles, Calif., Mar. 23-37, 1953. Application to aircraft quality materials. Photographs. (K1, AY)

571-K. Relation Between Welding Current and Appropriate Transmission of Filter Glasses. T. Rosskopf. *Welding Journal,* v. 32, Aug. 1953, p. 689-691.

Formula for determining most suitable eye protection. Tables, graphs. (K general, A7)

572-K. Stranded Electrode Materials for Aircomatic Welding. Harold Robinson and Harry C. Cook. *Welding Journal,* v. 32, Aug. 1953, p. 692-702.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Fabrication methods, compositions, welding characteristics, deposit properties and field applications. (K1, Al, Fe, Cu)

573-K. Fillerarc Welding Process. R. W. Tuthill. *Welding Journal,* v. 32, Aug. 1953, p. 703-707.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Developments and experimentation to market new equipment for consumable-electrode gas-shielded welding. Graphs, photographs. (K1)

574-K. Tricky Problems in Welded Ship Repair. Milton Forman. *Welding Journal,* v. 32, Aug. 1953, p. 715-720.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Analysis of suitable sequence in welding, proper use of preheating, suitable joint design and

careful workmanship. Diagrams. (K general)

575-K. Joining Aluminum to Other Metals. Mike A. Miller. *Welding Journal,* v. 32, Aug. 1953, p. 730-740.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Methods and materials for brazing, soldering, welding and resin bonding. Photographs, micrograph, table. 19 ref.
(K general, Al, St, Cu)

576-K. Heliarc Welding Helps Fabricate Nickel Pipe. *Welding Journal,* v. 32, Aug. 1953, p. 743.

Photograph. (K1, Ni)

577-K. Effects of Electrodes and Heat Treatments on Mild Steel Weldments. Ernest F. Nippes and Alexander Lesnewich. *Welding Journal,* v. 32, Aug. 1953, p. 353S-374S.

Presented at Thirty-Third National Fall Meeting, AWS, Oct. 19, 1952, Philadelphia, Pa. Beneficial effects of low-H type electrodes, preheat, post-heat and stress-relief heat treatments on the ductility and transition temperature of mild steel weldments. Tables, graphs, micrographs, diagrams. 29 ref.
(K1, J general, CN)

578-K. A Qualitative Study of Residual Stresses in Welds by Photoelasticity. Melvin Mark. *Welding Journal,* v. 32, Aug. 1953, p. 374S-377S.

Pictorial evidence of the effect on residual stresses of reducing the temperature difference in the vicinity of the weld by local heating. Photographs, graphs. 5 ref.
(K9, Q25)

579-K. Welding Metallurgy of Nodular Cast Iron. Edward E. Hucke and Harry Udin. *Welding Journal,* v. 32, Aug. 1953, p. 378S-385S.

Structure of two heat-affected zones and weld metal in nodular iron with and without preheat and postheat. Tables, micrographs, graphs. (K general, E25, CI)

580-K. The Incidence of Cracking in Welding Type 347 Steels. L. K. Poole. *Welding Journal,* v. 32, Aug. 1953, p. 403S-412S.

Survey of types and occurrence of cracking in various type welds. 14 ref. (K general, SS)

581-K. Speeds Production at Fentron Steel. Howard E. Jackson. *Western Machinery and Steel World,* v. 44, Aug. 1953, p. 87-90.

Manufacturer of steel windows and doors redesigned production methods and incorporated resistance welding for basic means of fabrication. Photographs. (K3, ST)

582-K. (Swedish.) **Pipe Formation in Welded Material.** Stig-Erik Erikson and Tore Norén. *Svetsaren,* v. 18, no. 1, 1953, p. 1-9.

Causes and ways of avoiding weld defect. Diagrams, photographs, photomicrographs. 6 ref.
(K general, ST)

583-K. (Swedish.) **OK H-Electrodes Used in Swedish Steel Mills.** Stig Lundin. *Svetsaren,* v. 18, no. 1, 1953, p. 9-13.

Composition and use of four types of alloy electrodes used for repair welding. Tables, photographs.
(K1, T5, AY)

584-K. Bell Wraps Solderless Connection for Joint Economy. Charles Emerson. *American Machinist,* v. 97, Aug. 31, 1953, p. 100-101.

Wrapping tool and advantages of the process. Photographs. (K13)

585-K. How to Butt-Weld 0.005-In. Stainless. Marvin S. Weinstein. *American Machinist,* v. 97, Aug. 31, 1953, p. 102-104.

How condenser-discharge techniques were used to butt weld 0.005- and 0.008-in. stock by spot welding. Photographs, diagrams. (K3, SS)

586-K. Report of Committee D-14 on Adhesives. Gerald Reinsmith, chairman. *American Society for Testing Materials,* Preprint no. 45, 1953, 11 p.

Recommendations, activities of subcommittees and methods of test for strength properties and effects of mold contamination. (K12)

587-K. Report of AWS-ASTM Joint Committee on Filler Metal. E. H. Turnock, chairman. *American Society for Testing Materials,* Preprint no. 63, 1953, 2 p.

Reports of subcommittees on mechanical properties.
(K general, Q general, ST, Cr, Cu, Al)

588-K. Landing Gear Struts Induction Preheated Before Arc Welding. Merle W. McLaughlin. *Automotive Industries,* v. 109, Sept. 15, 1953, p. 40-41.

Process and advantages. Photographs. (K1, J2, AY)

589-K. Modern Welding Technique. E. T. Gill and Eric N. Simons. *Edgar Allen News,* v. 32, Sept. 1953, p. 201-202.

Advantages, disadvantages and precautions in the use of various welding methods. (To be continued.) (K general, SS)

590-K. Automatic Arc Welding of Helically Wound Tubes. I. L. Brinberg, P. G. Rybalko, M. F. Khrobastov and V. P. Yakushjin. *Engineers Digest,* v. 14, Aug. 1953, p. 293-294, 315-316.

Translated and condensed from *Avtogennoye Delo,* no. 4, Apr. 1953,

p. 1-6. Advantages of welded tubes and particularly helically wound tubes. Development work leading to the construction of an automatic production line for wound tubes. Separate processes. (K1)

591-K. Improve Your Soldering With Noncorrosive Flux. W. S. Gale. *Iron Age,* v. 172, Sept. 3, 1953, p. 115-119.

Properties and uses of the fluxes. Photographs. (K7)

592-K. Adhesives. Agents for Bonding Fibrous Glass Pads to Metal. W. J. Clayton. *Iron Age,* v. 172, Sept. 17, 1953, p. 160-163.

Application techniques and advantages of adhesives. Photographs. (K11)

593-K. Developments in Submerged Melt Welding for Steel Plant Maintenance. D. E. Knight. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 98-104; disc., p. 104.

Process and advantages of submerged melt welding. Diagrams, graph, photographs. (K1)

594-K. Plant Welding Applications. H. J. Ralston. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 105-112.

Use of various welding processes valuable in steel plant maintenance. Photographs. (K general)

595-K. Cracking Temperature of Mild Steel Arc Welds During Cooling. Takuro Kobayashi. *Japan Science Review, Engineering Sciences,* v. 2, Apr. 1952, p. 287-295.

Method of estimating the cracking temperature by determining the degree of crystal fragmentation or lattice distortion on the surface of the cracks. Data determined by X-ray diffraction. Diagrams, photographs, table. 3 ref. (K1, K9, CN)

596-K. Filler Material for the Brazing of Titanium. N. A. DeCecco and H. M. Meyer. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers. Transactions,* v. 197, 1953, p. 1197-1198.

Use of Ag in brazing Ti. Explains why some brazing metals are unsatisfactory. 14 ref. (K8, Ti, Ag)

597-K. Aluminum Soldering. David Nova. *Light Metal Age,* v. 11, Aug. 1953, p. 20-37.

Problems and methods. Photographs. (K7, Al)

598-K. Brazing of Cemented Carbide Tools and Parts. F. J. Lennon, Jr. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 174-176, 178-180, 182.

Techniques. Photographs. (K8, C-n)

599-K. Victor Equipment Company Cuts Cost, Increases Production. Fred M. Burt. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 219-220, 222, 224, 226-227.

Apparatus and plant layout of a welding equipment manufacturer. Photographs. (K general)

600-K. Practical Stud Welding. R. W. Taylor. *Machinery (London),* v. 83, Aug. 28, 1953, p. 433-436.

Studs and attachments, power sources, relationship between stud diameter and plate thickness, local hardening and comparative costs. Photographs, diagram. (K1)

601-K. Select the Right Method to Join Aluminum to Other Metals. Mike A. Miller. *Materials & Methods,* v. 38, Sept. 1953, p. 96-99.

Materials involved, design of parts, permissible joining temperature and service requirements. Table, photographs. (K general, Al, W, Ti, Fe, Cu, Ni, Mg, Ag, Pb, Zn, Sn)

602-K. Fabricating Chemical Plant. J. F. Lancaster. *Metal Industry,* v. 83, Sept. 4, 1953, p. 192-194.

Use of argon-arc and Argonaut gas-shielded welding of various metals. Photographs. 4 ref. (K1)

603-K. Recent Developments in the Fusion Welding of Iron and Steel. J. W. Shedden and W. I. Pumphrey. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 78-84.

Electrode coatings, low-hydrogen electrodes, stainless steel welds, arc welding of cast iron, automatic inert-gas-shielded-arc welding and gas welding. Photographs, micrographs, tables, graphs. 20 ref. (K general, CI, SS, ST)

604-K. Chrysler Achieves High Production Rate with Automatic Welding. Herbert Chase. *Modern Machine Shop,* v. 26, Sept. 1953, p. 170-172, 174-175.

Special fixtures and welding techniques. Photographs. (K1)

605-K. "Metal Surgery" Reclaims Fractured Refrigeration Plant and Machinery. Clark Matthew. *Modern Refrigeration,* v. 56, Aug. 1953, p. 293-294.

Method of repairing metal equipment based on principle of corrugated fasteners to secure stress-points in wood. Diagrams. (K13)

606-K. Effect of Variation in Rivet Strength on the Average Stress at Maximum Load for Aluminum-Alloy, Flat, Z-Stiffened Compression Panels That Fail by Local Buckling. Norris F. Dow, William A. Hickman, and B. Walter Rosen. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note no. 2963, June 1953, 17 p.

Relationship between strength, diameter and pitch of rivets in compression panels. (K13, Q28, Al)

607-K. Some Aspects of the Welding of the Austenitic Steels. F. A. Ball. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 790-799.

Ways in which welding of these steels differs from that of mild steel and possible changes in technique. Photographs, graphs, micrographs, table. 5 ref. (K general, AY)

608-K. The Welding of Stainless and Heat-Resistant Materials at the Works of Welding Technical Services Ltd. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 805-815.

Various methods of welding strip, sheet, light plate and various fabricated units. Tables, photographs. 23 ref. (K general, SS, Ni, Cr)

609-K. Automatic Welding Improves Stainless Tube Output. *Steel,* v. 133, Sept. 21, 1953, p. 190-191.

Method and advantages of automatic inert-gas-shielded W-arc welding. Photographs. (K1, SS)

610-K. Locating Dimensions for Tube Welding Fixtures. Hans W. Smith. *Tool Engineer,* v. 31, Sept. 1953, p. 47-48.

Data on tube flare dimensions. Table, diagrams. (K general)

611-K. Welding Developments at Harland and Wolff. E. Cuthbert. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 310-317.

Accurate flame profiling and automatic machine welding developments. Photographs. (K general, ST)

612-K. Developments in Metallic Arc Welding of Corrosion and Heat-Resisting Alloys. M. C. T. Bystram. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 325-326.

Problems and importance of composition. (K1, SS, Ni, Cr)

613-K. Controlled Spot Welding of Light Alloys for Aircraft Production. N. K. Gardner. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 335-337, 365.

Investigation of process and derivation of design strengths. Graphs, table. (To be continued.) (K3, Al)

614-K. Here's What You Need to Know to Weld High-Alloy Castings. I. Chromium Alloys. II. The Chromium-Nickel Alloys. Earl M. Anger, William E. Dundon, and Garth Thompson. *Welding Engineer,* v. 38, Apr. 1953, p. 48-52; May, 1953, p. 58-62.

Welding processes, preheating requirements, welding techniques and postweld heat treatment. Information on straight-Cr, Cr-Ni, hardenable and non-hardenable alloys. Tables, photographs. (K general, AY)

615-K. Bascule Gates Welded for Horseshoe Dam. T. B. Jefferson. *Welding Engineer,* v. 38, Sept. 1953, p. 39-41.

Construction and welding of the gates. Gamma-ray inspection. Photographs. (K general, S13, CN)

616-K. Bell, Buzzer and Thermostat. Herman C. Phelps. *Welding Engineer,* v. 38, Sept. 1953, p. 42-43.

Describes Ag brazing of the above in electric furnaces. Photographs. (K8)

617-K. Wooden Patterns for Thermit Welding. E. Russell. *Welding Engineer,* v. 38, Sept. 1953, p. 44-46.

Use of thermit welding to restore broken mill rods. Photographs. (K4)

618-K. Quality Control of Resistance Welds. G. A. Covington. *Welding Engineer,* v. 38, Sept. 1953, p. 48-51.

Inspection program. Photographs. (K3, S12)

619-K. How to Weld the Heat-Resistant Alloys. Earl M. Anger, William E. Dundon, and Garth Thompson. *Welding Engineer,* v. 38, Sept. 1953, p. 52-56.

Cr-Ni alloys, Si-C ratio, welding characteristics, flames for gas welding and arc-welding requirements. Photographs, tables. (K1, K2, SG-h)

620-K. Torch Maintenance for a Quarry. J. Dean Davidson. *Welding Engineer,* v. 38, Sept. 1953, p. 58-61.

Abstract of a paper presented at the annual meeting of the International Acetylene Assoc., Atlanta, Ga., Apr. 13-15, 1953. Heavy heating with oxy-acetylene flame, oxy-acetylene welding and O_2 cutting processes. Photographs. (K2, G22)

621-K. Wet Blasting for Silver Brazing. *Welding Engineer,* v. 38, Sept. 1953, p. 62.

Scale removal from parts to be brazed. (K8, L10)

622-K. (Czechoslovakian.) **Dependence of the Notch Bar Impact Strength of Welded Metals on the Mn and Si Content of the Electrodes.** Josef Ditl. *Hutnické Listy,* v. 7, no. 12, Dec. 1952, p. 637-639.

Maximum values obtained for 0.6-1.0% Mn. Si content had little effect in the range tested. Tables, diagram, graphs. (K1, Q6, Mn, Si)

623-K. (Czechoslovakian.) **Treatment and Use of Copper and Copper Alloy Plated Steel Sheets.** J. Valter. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 404-410.

Riveting, soldering and welding. Tables, diagrams, 7 ref. (K general, Cu, ST)

624-K. (French.) **The Problem of Fragile Welds on Tin-Plate Vessels.** W. E. Hoare and J. P. Gustin. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 301-310.

Effect of the steel surface, tin plating, the Fe-Sn alloyed layer and the average thickness of the coating. Tables, photographs, micrographs. (K general, L17, ST)

625-K. (German.) **Status of Riveting in Light-Metals Structural Engineering.** E. W. Pleines. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 299-305.

Developments in use of large light-metal rivets. Photographs, graphs, diagrams, tables. (To be continued.) (K13, Al)

626-K. (German.) **Aluminothermal Welding of Aluminum Current Conductors.** J. Bollinger. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 595-597.

Welding process for bare and insulated cables and wires. Photographs, diagrams, tables. 11 ref. (K4, Al)

627-K. (German.) **The Acetylene Processes.** H. von Hoffe and H. Killing. *Schweissen und Schneiden,* v. 5, no.1, Jan. 1953, p. 4-12.

Welding and cutting processes and use of acetylene torch as a heat source. Individual processes and their present state of development. Photographs, graphs, diagrams, table. 27 ref. (K2, G22, Al, ST, Cu)

628-K. (German.) **Processes of Electric-Arc Welding.** K. L. Zeyen. *Schweissen und Schneiden,* v. 5, no. 1, Jan. 1953, p. 12-26.

Problem of increasing efficiency of manual process. Different types of electrodes and protecting gases. General review of automatic and semi-automatic methods. Photographs, graphs, diagrams, tables. 40 ref. (K1)

629-K. (German.) **Electric-Resistance Welding.** E. Hörmann. *Schweissen und Schneiden,* v. 5, no. 1, Jan. 1953, p. 26-41.

Uses and advantages of process and machines devised for its application. Photographs, diagrams, graphs, table. 21 ref. (K3)

630-K. (German.) **The "Thermit" Welding Process in Shipbuilding.** Wilhelm Ahlert. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 225-233.

Metallurgy of the process, repair of large parts of ships and constructional welding in shipbuilding. Tables, photographs, micrographs. (K4, ST)

631-K. (German, French.) **Blind Riveting.** Hans Bosshard. *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 127-133.

Pop, Chobert and Avdel systems used in Switzerland. Tables, graphs, photographs, diagrams. (K13, Al)

632-K. (Russian.) **Electric Arc Welding of Copper.** D. A. Liukevich, S. I. German, and V. G. Kononenko. *Avtogennoe Delo,* v. 24, no. 2, Feb. 1953, p. 15-17.

Phosphor bronze rods with 8-10% Pb and 0.28-0.85% P gave very good results. Tables, photographs, micrographs. 3 ref. (K1, Cu)

633-K. (Spanish.) **Investigation on the Fatigue Resistance of Welded Joints as Compared to Screwed Joints.** F. Koenigsberger and Z. Garcia Martin. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 10 p.

Effect of alternating forces on the fatigue resistance of welded joints and factors which can reduce or eliminate this effect. Tables, diagrams. (K general, Q7, CN)

634-K. (Spanish.) **Proposed Classification of Weldability Tests.** H. Granjon. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 18 p.

Report of Committee No. 9 of the International Welding Inst. Purpose of investigation, tests, and proposes a preliminary classification. 5 ref. (K9)

635-K. (Book.) **The Behavior of Aluminium Alloy Riveted Joints.** A. J. Francis. Research Report No. 15. 96 p. 1953. Aluminium Development Association, 33 Grosvenor St., London W.1, England. 7s. 6d.

Reports on theoretical and practical investigations on the action of double shear riveted joints in Al under axial and eccentric loading in and beyond the elastic range. (K13, Q21, Al)

636-K. (Book.) **Bibliography of Resistance Welding.** Resistance Welder Manufacturers Association, 1900 Arch St., Philadelphia 3, Pa., RWMA Bulletin 17, 56 p. $1.25.

Articles on all phases of resistance welding published in U. S. since 1946. (K3)

637-K. (Book.) **Weldability of Steels.** Robert D. Stout and W. D'Orville Doty. 381 p. 1953. Welding Research Council, 29 West 39th St., New York, N. Y. $6.50.

Critical review of the available information on carbon and low-alloy steels. Results of research on weldability. (K9, ST)

638-K. The Fabrication of Copper Vessels. J. B. Carroll. *Australasian Engineer,* 1953, Feb. p. 56-57.

Procedures for welding Cu sheet. Diagrams. (K general, Cu)

639-K. Multitransformer Welding Presses. Jack Ogden. *Electrical Engineering,* v. 72, Oct. 1953, p. 919-924.

Advantages of press welding in high-production applications. Equipment and methods. Diagrams, graphs. (K5)

640-K. How to Set Up Welding Procedures to Minimize Distortion. E. R. Beyer. *Industry & Welding,* v. 26, Oct. 1953, p. 55-58, 61, 106-107.

Careful design of weldments eliminates distortion caused by "overwelding". Photographs. (K general)

641-K. Where to Use Brazing Alloy Preforms. H. H. Olson. *Industry & Welding,* v. 26, Oct. 1953, p. 82-84, 86, 150-152.

Photographs, diagram. (K8)

642-K. Facts About Low Hydrogen Electrodes. Richard K. Lee and J. O. Cavanagh. *Industry & Welding,* v. 26, Oct. 1953, p. 90-92, 95-99.

History, effects of slag and H_2, welding procedures and applications. Photographs, diagrams. (K1)

643-K. Chamfering and Grooving Electrode Speeds Preparation for Welding. Wm. B. Kriewall. *Industry & Welding,* v. 26, Oct. 1953, p. 101-102, 104-105.

Special coating which creates blasting effect and removes molten metal ahead of arc, leaving bright, clean groove. Photographs. (K1)

644-K. Here's How Welding Research Pays Off at Allis-Chalmers. *Industry & Welding,* v. 26, Oct. 1953, p. 109-110, 112-113.

Welding equipment of all types available in Allis-Chalmers welding laboratory to duplicate and check welding procedures used in production and maintenance. Photographs. (K general)

645-K. Procedures for Welding the 17% Chromium Stainless Steels. *Metal-Working,* v. 9, Oct. 1953, p. 20-21.

Preheating and filler metals for welding, properties of welds, and applications and advantages of various types of welding. Tables. (K general, SS)

646-K. Correct Welding Procedure. IV. Lester F. Spencer. *Sheet Metal Worker,* v. 44, Sept. 1953, p. 87-89.

Welding of steel coated with Sn, terne, Cr, Ni or Cd. Tables. (To be continued.) (K general, CN, Sn, Pb, Cr, Ni, Cd)

647-K. Argon-Arc Welding of Copper and Copper Alloys. Edwin Davis and E. A. Taylor. *Welding and Metal Fabrication* v. 21, Oct. 1953, p. 370-376.

Equipment, materials and techniques. Micrographs, tables. 7 ref. (To be continued.) (K1, Cu)

648-K. Self-Adjusting Arc Welding of Aluminium Alloys. J. E. Tomlinson and J. G. Young. *Welding and Metal Fabrication,* v. 21, Oct. 1953, p. 377-386.

Equipment and procedure. Graphs, tables, micrographs, photographs. (K1, Al)

649-K. Controlled Spot Welding of Light Alloys for Aircraft Production. II. N. K. Gardner. *Welding and Metal Fabrication,* v. 21, Oct. 1953, p. 392-401.

Inspection techniques and design data. Graphs, tables. 8 ref. (K3, EG-a)

650-K. Thin Sheets to Thick Pipe. Not Difficult Here. Robert Thomas. *Welding Engineer,* v. 38, Oct. 1953, p. 62-63.

Filler and carbon-arc welding processes. Photographs. (K1, CN)

651-K. Good Things Come in Small Packages. *Welding Engineer,* v. 38, Oct. 1953, p. 64-65.

Submerged-arc welding of small containers. Photographs. (K1)

652-K. What Goes Into a Welding Electrode? II. D. L. Mathias. *Welding Engineer,* v. 38, Oct. 1953, p. 66-68, 70.

Physical formulation of coating composition and effect of physical factors on duties of electrode coating. Photographs, graphs. (Concluded.) (K1)

653-K. Carbide Segregation in 1¼ Cr-½ Mo Steel Pipe Welded Joints. I. A. Rohrig and H. S. Blumberg. *Welding Journal,* v. 32, Sept. 1953, p. 815-822.

Results of tests on weldability and response to postwelding heat treatments. Emphasis on carbide segregation and prevention. Tables, micrographs. (K9, AY)

654-K. Arc Welding of Ferritic and Austenitic Nodular Cast Iron. J. Sohn, W. Boam and H. Fisk. *Welding Journal,* v. 32, Sept. 1953, p. 823-833.

Studies on filler wires for jet engine assemblies. Photographs, tables, diagrams. (K1, CI)

655-K. A Comparison of Shielding Mixtures for Gas-Shielded Arc Welding. J. W. Cunningham and H. C. Cook. *Welding Journal,* v. 32, Sept. 1953, p. 834-841.

Shielding qualities of gas and effects on arc characteristics and resultant weld deposit. Photographs, graphs, diagram. (K1)

656-K. Porosity in the Welding of Carbon Steel. Glenn W. Oyler and Robert D. Stout. *Welding Journal,* v. 32, Sept. 1953, p. 454s-460s.

Effects of current density, deoxidation practice of electrodes and

base metal, and addition agents to the inert-gas atmosphere, on formation of porosity in inert-gas-shielded metal-arc welds in C steel. Tables, graphs, photographs. (K1, CN)

657-K. Thermal Cycles in the Arc Welding of ½-In. Titanium Plate. E. F. Nippes, J. M. Gerken, B. W. Shaff, and E. C. Nelson. *Welding Journal,* v. 32, Sept. 1953, p. 461s-474s.

Microstructures and mechanical properties relating to optimum welding conditions. Tables, graphs. 6 ref. (K1, M27, Q general, Ti)

658-K. (French.) **Control of Spot Welding by Measuring the Welding Parameters (Current and Pressure).** L. Pelletier. *Soudure et Techniques connexes,* v. 7, nos. 7-8, July-Aug. 1953, p. 171-179.

Apparatus which registers electrode pressure and current. Diagrams, tables, photographs. (K3)

659-K. (French.) **Load Voltage in Arc Welding With Coated Electrodes; Influence on Electrical Characteristics of Welding Equipment.** M. Moneyron. *Soudure et Techniques connexes,* v. 24, nos. 7-8, July-Aug. 1953, p. 191-197.

Nature of coatings, intensity and density of current and arc length. Tables, graphs. (K1)

660-K. (German.) **Influence of Electrode Coatings on Formation of Fish Eyes in Unalloyed Steel Weld Deposits and the Origin of Such Defects.** Friedrich Erdmann-Jesnitzer and Hans Kowalkowski. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 361-368.

Wood powder and kaolin as H_2 formers. Fish eye formation and elimination by changing electrode coatings. Micrographs, diagrams, tables. 16 ref. (K1, ST)

661-K. (German.) **Assumptions and Directions for Deep-Penetration Welding.** Herbert Neumann. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 297-305.

Welding machines and applications. Photographs, graphs, tables, diagrams. 4 ref. (K6)

662-K. (German.) **Automatic Welding With "Fusarc" Electrodes.** Camille De Rop and Hans Schmide-Bach. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 315-318

Built-up electrode consisting of core, coating and spiral wire netting to improve electric conductivity. Design, types and uses in boiler shops and structural and maritime engineering. Photographs, tables, diagram, graph. (K1)

663-K. (German.) **Recent Developments and Experiments in Submerged Arc Welding.** W. Mantel and L. Wolff. *Schweissen und Schneiden,* v. 5, no. 9, Sept. 1953, p. 339-347.

Characteristics, structure and properties of welded joints, fluxes, welding electrodes and new methods and equipment. Graphs, tables, photographs, diagrams. 4 ref. (K1)

664-K. (German.) **Safety Devices of Gas Generation and Supply Plants; Their Importance in Welding and Cutting Operations.** M. Konschak and W. Scheruhn. *Schweissen und Schneiden,* v. 5, no. 9, Sept. 1953, p. 347-350.

Evaluates devices used to prevent back firing and back flow of gas. Diagrams. (K2, A7)

665-K. (German.) **Two Rapid-Welding Methods.** *Schweisstechnik,* v. 7, no. 6, June 1953, p. 73-75.

"Gillemont" and "Humboldt-Meller" welding methods. Diagrams. (K6)

666-K. (German.) **Welding of "Torstahl".** Stefan Soretz. *Schweisstechnik,* v. 7, nos. 7/8, July-Aug. 1953, p. 77-90.

Flash-butt and electric fusion welding, tempering and testing of concrete-reinforcing steel rods. Diagrams, graphs, tables, photographs. 5 ref. (K3, K1, J29, ST)

667-K. (German.) **Electric-Arc Welding of Aluminum.** Benno Sixt, *Schweisstechnik,* v. 7, nos. 7/8, July-Aug. 1953, p. 90-93.

Conditions for welding Al and Al alloys. Diagrams, photographs, graphs, tables. (K1, Al)

668-K. The Strength of Metal Joints Made With Synthetic Resins. K. Frey. *Aircraft Engineering,* v. 25, Oct. 1953, p. 317-320.

Influence of geometry of lap joints on their strength. Diagrams, graphs, table. 7 ref. (K12)

669-K. Sheet-Metal Welding. I. Fusion-Welding, Argon-Arc and Heliarc Processes. *Aircraft Production,* v. 25, Oct. 1953, p. 362-371.

New developments in relation to various forms of fusion welding, particularly as applied to argon-arc and submerged-arc processes. Diagrams, photographs. (K1, SS, Ni, Cr)

670-K. Two Inert Gases Are Used to Weld Ultra-Thin Metals. *Industry & Welding,* v. 26, Nov. 1953, p. 53, 54, 82.

Welding of stainless steel sections using argon on top and helium on the underside. Photographs. (K1, SS)

671-K. Flash Welding the Aluminum Alloys. Lester F. Spencer. *Industry & Welding,* v. 26, Nov. 1953, p. 66-68, 71, 72.

Process and critical factors to be controlled. Photographs, diagram. (To be concluded.) (K3, Al)

672-K. The Welding of Certain Heat-Resisting Steels. J. A. McWilliam. *Institute of Welding, Transactions,* v. 16, Aug. 1953, p. 96-99.

Comparison of metal-arc welding of two steels and mechanical test results on parent metals and welds. Tables, photographs, graphs. (K1, AY)

673-K. The Schlieren Apparatus as a Research Tool in the Welding Industry. Walter Moen. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 203-207.

Principle upon which Schlieren apparatus is based; features of optical, mechanical, and electrical design of each of the components; and various techniques developed to meet requirements of problems. (K9)

674-K. Brazing and Soldering Titanium. William Rostoker. *Light Metal Age,* v. 11, Oct. 1953, p. 11, 26.

Problems encountered and procedures employed. (K8, K7, Ti)

675-K. Induction Welding Process Speeds Light Metals Tubing Production. T. J. Crawford. *Light Metal Age,* v. 11, Oct. 1953, p. 14-15, 26.

New process for fabrication of nonferrous metals. Diagrams, photographs. (K6)

676-K. Automatic Arc Welding Aids Assembly of Diesel Engine Parts. Herbert Chase. *Machinery,* v. 60, Oct. 1953, p. 153-157.

Equipment used for submerged-arc welding of internal and external parts. Diagrams, photographs. (K1)

677-K. Adhesives for Metal. *Mechanical World and Engineering Record,* v. 133, Oct. 1953, p. 449.

Developments with polyvinyl formalin and phenol formaldehyde resins make possible strong joints between two metals; and metals and nonmetals. (K12, K11)

678-K. Some Notes on the Control and Design of Parts for Resistance, Spot, Projection and Seam Welding. R. Bushell. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 879-884.

Influence of pressure on electrodes, weld time and secondary current. Diagrams, photographs, tables. (K3)

679-K. Correct Welding Procedure. V. Welding of Aluminum-Base Alloys I. Lester F. Spencer. *Sheet Metal Worker,* v. 45, Oct. 1953, p. 61-62, 64, 71, 72.

Fusion welding by resistance, flame, and arc methods. Tabulation of compositions and mechanical properties of aluminum alloys. Tables, photographs. (To be continued.) (K1, K2, K3, Q general, Al)

680-K. Low Hydrogen Electrodes, Fundamentals and Applications. Richard K. Lee and J. O. Cavanagh. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 101-105.

History, growth, basic fundamentals on effect and control of H_2, welding procedures and applications. Diagrams, photographs. (K1)

681-K. (Dutch.) **The Deposition Rates for Arc Welding Electrodes and Their Tolerances.** P. G. Weeber. *Smit Mededelingen,* v. 8e, no. 2, Apr.-June 1953, p. 57-58; disc., p. 58-59.

Melting speed of welding rods as a function of amperage. Graph. (K1, ST)

682-K. (Dutch.) **Argon-Arc Welding in the Automobile-Body Industry.** P. J. Verlee. *Smit Mededelingen,* v. 8e, no. 2, Apr.-June 1953, p. 63-64.

Electric arc welding under an inert-gas atmosphere. Tables, photograph. (K1)

683-K. (Dutch.) **Some Problems on the Weldability of Steel. The Effect of Segregation on the Weldability of Normal Structural Steel.** A. Ph. Krijff. *Smit Mededelingen,* v. 8e, no. 2, Apr.-June 1953, p. 65-70; disc., p. 70-72.

Possible causes of defective welds. Tables, photographs, micrographs. (K9, ST)

684-K. (Dutch.) **Electrode News.** *Smit Mededelingen,* v. 8e, no. 3, July-Sept. 1953, p. 95-96.

Inversa and Pergo electrodes. Diagrams, photographs. (K1)

685-K. (Dutch.) **The Cracking of Weld Joints.** G. Westendorp. *Smit Mededelingen,* v. 8e, no. 3, July-Sept. 1953, p. 87-94.

Shrinkage stresses, solidification of welds, mechanical properties at high temperatures and crack-sensitivity of different types of fillet welds. Diagrams, graphs, photographs. 10 ref. (K9, Q26)

686-K. (French.) **Recommendations Worked Out by Committee no. 9 (Weldability) of the International Welding Institute.** *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, p. 83-87; and insert supplement to this issue, "Suggestions for Classification of Weldability Tests". H. Granjon. p. 1-13.

Minimum conditions imposed on carbon and low manganese steels to make them adaptable to electric-arc welding. Tables. 5 ref. (K9, CN, AY)

687-K. (German.) **Effect of Arsenic on the Hot Working and Weldability**

of Coppper. A. Schleicher. *Acta Technica Academiae Scientiarum Hungaricae*, v. 6, nos. 1-2, 1953, p. 201-207.
Effects on weldability, quality of weld, tensile strength and elongation. 13 ref. (K9, Q23, As, Cu)

688-K. (German.) **Shapes and Joints in Machine-Building.** Karl Jurczyk. *Schweissen und Schneiden*, v. 5, no. 7, July, 1953, p. 252-256.
Shapes and joints of plants and animals applied to machine building. Welding techniques employed. Photographs, diagrams. 10 ref. (K general)

689-K. (Russian.) **Building-Up of Cutting Tools by Electric Arc.** M. S. Poliak and G. A. Proskin. *Stanki i Instrument*, v. 24, no. 6, June 1953, p. 21-23.
Compares alloys and presents methods of preparation. Electrode selection. Tables, graphs, diagrams. 5 ref. (K1, TS)

690-K. Special Fixtures Speed Army Tractor Hull Welding. H. W. Lindsay. *American Machinist*, v. 97, Oct. 26, 1953, p. 113-117.
Plant layout, equipment and procedure. Photographs. (K general)

691-K. Machine Welds Powder Cans at 100 Ipm. E. A. Hess. *American Machinist*, v. 97, Oct. 26, 1953, p. 118-119.
Fabrication of oblong powder cans for ordnance. Automatic arc welding set-up fastens head and bottom to body with 3-o'clock welds at high speed. Photographs. (K1)

692-K. Stud Welding. *Automobile Engineer*, v. 43, Oct. 1953, p. 419-420.
Advantages and applications of process by which studs, pins and other small attachments can be welded to surfaces of metal components. (K1)

693-K. Automatic Welding in Castings Repair. *Canadian Metals*, v. 16, Oct. 1953, p. 54, 56, 58.
Tests which demonstrate merits of above, using a heavy steel casting for the investigation described. Photographs, table. (K general, ST)

694-K. The Metallurgy of Welding Manganese Steel. *Edgar Allen News*, v. 32, Oct. 1953, p. 222-224.
Technique for avoiding embrittlement. Micrographs, table. (To be concluded.) (K general, AY)

695-K. Modern Welding Technique. XIX. Stainless and Heat-Resisting Steels. XX. Miscellaneous Non-Ferrous Alloys. E. T. Gill and Eric N. Simons. *Edgar Allen News*, v. 32, Oct. 1953, p. 233-234.
Gas, atomic hydrogen and metallic-arc welding of stainless steels, heat resisting steels, nickel and nickel alloys. Table. (To be continued.) (K1, K2, SS, Ni)

696-K. Current-Slope Control for Resistance Welders. R. O. Johnsen. *Electronics*, v. 26, Nov. 1953, p. 158-159.
Simple six-tube unit which permits control of buildup and decay rates of welding curent, and gives longer electrode tip life and more uniform welds on aluminum and magnesium. Photograph, diagrams. (K3, Al, Mg)

697-K. Development of Inert-Gas Welding. *Steel Horizons*, v. 15, Fourth Quarter, 1953, p. 24.
Explanation of two modern methods and advantages on stainless steel of various thicknesses. Photographs. (K1, SS)

698-K. Hard-Zone Crack Sensitivity and Strength of Two Low-Alloy Steels. C. L. M. Cottrell, J. G. Purchas, and B. J. Bradstreet. *Welding Research*, v. 7, Aug. 1953, p. 76-79.
Mechanical and weldability tests. Effect of heat treatment at various temperatures on mechanical properties and microstructure of two steels. Tables, graphs, photographs. 2 ref. (K9, Q general, M27, AY)

699-K. Self-Adjusting Arc and Controlled-Arc Welding Processes. W. G. Hull and J. C. Needham. *Welding Research*, v. 7, Aug. 1953, p. 80-95.
Essential features and fundamental aspects of processes, such as arc characteristics and material transfer. Reports information available on welding of ferrous and nonferrous materials. Tables, photographs, graphs, diagrams. 25 ref. (K1)

700-K. Fusion Welding Provides Projection-Free Surfaces On High-Heat Super Alloys. J. R. Fullerton. *Western Metals*, v. 11, Oct. 1953, p. 78-81.
Types of shielded-arc welding including "Heliarc", "Sigma", "Unionmelt", atomic hydrogen and coated electrode methods. Photographs. (K1)

701-K. (German.) **Riveting in Light-Metal Structures.** E. W. Pleines. *Aluminium*, v. 29, no. 9, Sept. 1953, p. 370-374.
Functions and qualities of cold headed, light-metal rivets. Concludes that cold upset rivets without heads meet minimum safety specifications. Diagrams, graph, table. (K13, Al)

702-K. (German.) **Oxy-Acetylene Welding of Aluminum Materials.** *Aluminium Ranshofen, Mitteilungen*, 1953, no. 2, July, p. 30-34.
Weldability and procedure for welding aluminum and its alloys. Diagram, tables. (K2, Al)

703-K. (German.) **Repair of Iron Castings by Welding.** Hans Höll.

Schweissen und Schneiden, v. 5, no. 10, Oct. 1953, p. 368-374.

Shrinkages and stresses of gray cast iron. Carbon-arc welding with partial preheating, preheating and post heating; brazing; straightening of iron castings; and electric welding with pre and postheating. Photographs, micrographs, diagrams. (To be continued.)
(K1, K8, K6, CI)

704-K. (German.) **Development of Plain Carbon Steel Welding Electrodes With Lime Coating.** Camille De Rop and Hans Schmidt-Bach. *Stahl und Eisen*, v. 73, no. 19, Sept. 10, 1953, p. 1212-1215.

Good bead formation without pores. Results of fatigue tests under pulsating stresses; and folding, tensile and notched-bar impact tests. Tables, graphs, photographs. 12 ref. (K1)

705-K. (Book.) **Design of Structural Welded Details.** F. H. Abrahms. 2 Ed. 1953. 76 p. Association of Engineering and Shipbuilding Draughtsmen, Onslow Hall, The Green, Richmond, Surry, England. 3s.

Data on strength of various types of welds. Design of angle and beam connections, plate girders, stanchion bases, and roof trusses. Illustrations. (K general)

706-K. (Book.) **The Joining of Metals.** 174 p. Institution of Metallurgists. 4 Grosvenor Gardens, London S.W. 1, England. 14 s.

Includes "Metallurgical Principles of Joining of Metals", Hugh O'Neill; "Metallurgy of the Welding of Nonferrous Metals", W. K. B. Marshall; "Metallurgy of Welding of Carbon and Low-Alloy Steels", L. Reeve; "Metallurgy of Welding of the Cr-Ni Austenitic Steels", F. H. Keating; "Metallurgy of Soldering and Brazing", J. C. Chaston; and "Determination of Weldability", J. B. Ball. (K general)

707-K. (Book.) **Weld Standards.** 19 p. Lincoln Electric Co., Cleveland 17, Ohio. $1.00.

Standards cover manual butt welding, fillet welds, and lap and corner welds in all positions in both plate and sheet metal. Use of tracing paper makes the standards easy to reproduce by blueprinting or other methods. (K general, S22)

SECTION L

CLEANING, COATING and FINISHING

1-L. Asphaltic Coatings Can Reduce Corrosion. K. N. Cundall. *Chemical Engineering,* v. 59, Nov. 1952, p. 284, 286.

Use of asphaltic products to prevent corrosion in chemical and chemical processing plants. (L26)

2-L. The Filtration and Pumping of Plating Solutions. G. T. Colegate. *Electroplating and Metal Spraying,* v. 5, Oct. 1952, p. 327-331; Nov. 1952, p. 367-371, 373-374.

General considerations affecting standard of filtration required and choice of filter and accessories. Operation of filter systems, and piping in pumping and filtration processes. (L17)

3-L. Substitutes for Nickel Plate. *Electroplating and Metal Spraying,* v. 5, Nov. 1952, p. 361-366.

Replies to questionnaire on alternatives to standard Ni-Cr plating are tabulated, covering Cu-Cr, thin Ni between Cu and Cr, red bronze-Cr, Ni between red bronze and Cr, white brass-Cr, bright zinc, Sn-Ni, and other finishes.
(L17, Ni, Cr, Cu, Zn, Sn)

4-L. Wash Primer. *Industrial Finishing,* v. 29, Nov. 1952, p. 26, 28, 30.

Use to provide adhesion between metal-protective paints and a variety of hard-to-finish metals such as stainless steel, Al, Zn, Cd, Sn, Mg alloys, and galvanized iron. Compositions and applications.
(L14, SS, Al, Zn, Cd, Sn, Mg, Fe)

5-L. Preparing and Painting Metal Specialties. Walter Rudolph. *Industrial Finishing,* v. 29, Nov. 1952, p. 48-50, 52, 54.

Facilities at Steel Partitions, Inc., Jamestown, N. Y., for specialty work include spray booths, ovens, and conveyor line; facilities for sanding a variety of surfaces; vapor degreasing; rustproofing; filling, baking, and sanding to make smooth surfaces, and hot-enamel spraying. (L26)

6-L. Some Factors in Spray-Silvering. P. B. G. Upton, G. W. Soundy, and G. E. Busby. *Journal of the Electrodepositors' Technical Society,* v. 28, 1952, p. 103-113. (Preprint)

Process developed for use in electrotyping. A solution of formaldehyde for the reduction of silver ammonio-nitrate solution is used. Tables and graphs. (L23, Ag)

7-L. Developments in Finishing Aluminium Castings. A. P. Fenn. *Metal Industry,* v. 81, Sept. 26, 1952, p. 367-369.

Mechanical finishes, paint finishes, electroplated finishes, anodizing, electro-brightening, vitreous enamel finishes, and hard-surfacing processes. (L general, Al)

8-L. Copper Recovery From Pickling Solutions. *Metal Industry,* v. 81, Nov. 7, 1952, p. 370.

Processes introduced because of shortage of H_2SO_4 and high cost of Cu. (L12, A8, Cu)

9-L. Metal Cleaners. Part II. Milton A. Lesser. *Soap and Sanitary Chemicals,* v. 28, Nov. 1952, p. 46-49, 98.

Requirements and properties. 56 ref. (L12)

10-L. Chromium Plating Pays Off for Steel Mills. *Steel,* v. 131, Nov. 24, 1952, p. 108, 111-112.

Advantages are noticeable decrease in operating costs and maintenance downtime, greater resistance to corrosion, and increase in packing life. (L17, T5, Cr, ST)

11-L. What's Ahead the Next Ten Years in Finishing. *American Machinist,* v. 96, Mid-Nov. 1952, p. H-H7.

Trend for greater mechanization, organic coatings as rust inhibitors, electroplating, polishing, and chemical treatment. (L general)

12-L. Coating Metals With Aluminum by the Mollerizing Process. Bruce E. Haight. *Automotive Industries,* v. 107, Nov. 1952, p. 39, 96.

A successful method of hot dipping ferrous parts in molten alu-

minum in use by the American Mollerizing Corp., Beverly Hills, Calif. (L16, Fe, Al)

13-L. Ceramic Coatings Have Practical Uses. F. R. Nagley. *Bureau of Ships Journal,* v. 1, Dec. 1952, p. 36.

Naval investigation of ceramic coatings for ship parts and accessories with 615 Al alloy and Cr-Ni austenitic steel as base metals. (L27, Al, SS)

14-L. Vacuum Metallizing of Metals and Plastics. R. W. Brown. *Canadian Chemical Processing,* v. 36, Nov. 1952, p. 38, 40.

Process by which Al in vapor phase is sprayed on metals, plastics, and glass by means of a vacuum apparatus. (L23, Al)

15-L. Laundering Applied to Metals. *Canadian Metals,* v. 15, Nov. 1952, p. 58, 60.

Reclamation of metal parts by cleaning methods used by Metal Laundry Ltd., Toronto. (L12)

16-L. Ultrasonic Tinning Techniques for Aluminum. Alan E. Crawford. *Electronics,* v. 25, Dec. 1952, p. 102-105.

Ultrasonic drivers on soldering irons and solder pots produce cavitation action that removes oxide film from Al, giving simultaneous cleaning and tinning without flux. Oscillator system is self-driven at natural resonant frequency of load through use of pickup coil on magnetostriction driver, eliminating need for tuning. Photographs and diagrams. (L16, Al)

17-L. Water Control Plays Important Role in Finishing of Aluminum. Kenneth E. Walden. *Finish,* v. 9, Dec. 1952, p. 31-32, 63.

Use and advantages of demineralized water for rinsing Al products. (L12, Al)

18-L. Magnesium Finishes for Aircraft Evaluated. Howard D. Childers. *Iron Age,* v. 170, Dec. 4, 1952, p. 157-161.

Magnesium finishes for production applications were evaluated. The goal of obtaining better protection with less paint was accomplished. Several pigmented vinyl-type primers gave 2-3 times more protection than that of the present system. Diagrams, tables, and photographs. (L26, Mg)

19-L. Silver and Gold Plated Parts Meet Tough Specifications. T. C. Du Mond. *Materials & Methods,* v. 36, Nov. 1952, p. 114-115.

How extremely small parts made from a variety of ferrous and nonferrous materials are being successfully plated. Coatings meet close tolerances and successfully pass rigid tests. (L17, Au, Ag)

20-L. Dip Painting and Spray Coating. M. Reeves. *Metal Industry,* v. 81, Nov. 21, 1952, p. 404-405.

Several methods of applying paint to metal surfaces, with particular emphasis upon spraying technique, ranging from small single spraying units to very large industrial installations. (L26)

21-L. Recent Developments in Protective Coatings. Allen G. Gray. *Metal Progress,* v. 62, Nov. 1952, p. 90-93.

Plating of Al on Fe, various metals on Al and Mg, Sn-Zn alloy plating, and protective siliconizing of Mo. Photographs and tables. (L17, L15)

22-L. Protection of Tubular Structures From the Weather by Metallizing. Alfred Clift. *Metal Progress,* v. 62, Nov. 1952, p. 100-104.

Protection of tubular steel structures against atmospheric corrosion. Particular emphasis is placed on sprayed coatings of Zn or Al. Methods are described. (L23, R3, Zn, Al, ST)

23-L. Here's *Low-Down* On Aluminum Paint. M. C. Davis. *Power,* v. 96, Dec. 1952, p. 123-125.

Steps for applying Al paint include preparing surface, use of surface-preparation chemicals to prevent corrosion, effect of wet surfaces, and application. (L26, T29, Al)

24-L. Flame-Plating . . . A New in Metal Processing. *Western Machinery and Steel World,* v. 43, Nov. 1952, p. 91-93.

Method of applying powder metal —such as tungsten carbide—to hard surfacing of metal parts recently announced by Linde Air Products Co. It permits depositing tungsten carbide in form of a thin coating undiluted by welding rod or base metal. (L24, W, C-n)

25-L. (French.) The Use of Aluminum Paint for Heat Insulation on French Railroads. *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 347-349.

Experiments show little difference in heat insulation with glass wool, cork, or Al paint. Applications of the latter in railroad cars. (L26, Al)

26-L. (French.) Thin Metallic Layers. Their Production and Electrical Properties. Gaston Ranc. *Vide,* v. 7, July-Sept. 1952, p. 1211-1219.

Experimental methods for evaporation in a vacuum, influence of thickness on electrical resistance of the layer, evolution of layers as a function of time, influence of support, and of temperature. Charts and micrographs. (L25, P15)

27-L. (German.) Cleaning and Descaling Preparatory to the Enameling of

Gray Iron. G. Gesche. *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.V.*, v. 29, Sept. 1952, p. 325-328.

Methods and equipment. Surface treatment influences the formation of gases during the enameling process. Diagrams, photographs, and graphs. (L27, CI)

28-L. A Study of the Direct Bonding of a Tin-Base Babbitt Metal to Grey Cast Iron. F. T. Smith. *Australasian Engineer,* Oct. 7, 1952, p. 59-65.

Manufacture of centrifugally cast Babbitt bearings with gray cast iron backings. Particular attention is paid to preparation of cast-iron surface, preparatory to tinning. Micrographs and table. (L22, Sn, CI)

29-L. How Protective Coatings Fight Corrosion. Kenneth Tator. *Chemical Engineering,* v. 59, Dec. 1952, p. 143-190.

An exhaustive report on painting programs, organic coatings and their properties, including a list of trade names and manufacturers, and a list of metals and alloys for corrosion resistant structures. Introduction by John R. Callaham. (L general)

30-L. Properties of Steel Enameling. Part I. M. B. Gibbs and F. R. Porter. *Finish,* v. 9, Dec. 1952, p. 21-23, 70, 72.

Chemical analyses and an outline of physical properties and finishing characteristics of mild steel, enameling iron, and special irons and steels such as Ti-bearing steel. (To be continued.) (L27, CN, Fe)

31-L. Changes in the Processes and Products of the Tin Plate Industry: II. Charles A. Ferguson. *Industrial Heating,* v. 19, Nov. 1952, p. 2089-2090, 2093-2094, 2096, 2098, 2100.

Changes in processes of annealing, temper rolling and coating steel with tin. (To be continued.) (L17, J23, F23, CN, Sn)

32-L. Mechanical Cleaning Gives Higher Luster at Lower Cost. W. G. Patton. *Iron Age,* v. 170, Dec. 11, 1952, p. 155-157.

How abrasive scouring has helped boost production of stainless steel with a mirror-like finish at Midland Works of Pittsburgh Crucible Steel Co. (L10, SS)

33-L. Automatic Hard-Facing of Tungsten Carbide. *Machinery,* v. 59, Dec. 1952, p. 196.

Equipment and process including a Heliweld head, control panel, wire positioner, hopper arc welding machine, and He regulator. (L24, AY, C-n)

34-L. Finishing Plant Engineering. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 19, 22, 24, 28-30, 32-48, 50, 52, 54-58, 60-62, 64-66, 68-70, 74, 76, 78, 80-84, 86, 88, 90, 92, 94, 96, 98, 100-104, 106-114.

Consists of following papers: "Plating-Room Layout", J. J. Martin, Jr., "Plating Room Floor Construction", V. A. Curll; "Mechanical Exhaust for Plating Rooms", B. F. Postman; "Choosing the Full Automatic", John V. Davis; "Essentials of Plating Rack Design", William E. Belke; "Electrical Power for Plating. I. Motor-Generators", A. P. Munning. "II. Rectifiers", Philip P. Bruno; "Calculating Voltage Drops in Bus Bars", Raymond F. Ledford; "Corrosion Resistant Tanks and Linings", Paul G. McDermott; "Protective Coatings in the Plating Industry", Raymond B. Seymour; and "Control and Treatment of Metal Finishing Wastes", David Milne. (L17)

35-L. Mechanical Surface Preparation. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156-166, 168-172.

Consists of the following papers: "Polishing and Buffing", H. L. Kellner; "Abrasives and Compounds for Polishing and Buffing", Howard J. McAleer; and "Barrel Finishing", Peter L. Veit. (L10)

36-L. Chemical Surface Preparation. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 173-174, 176-182, 184, 186-190, 192-194, 196-204, 206-245.

Consists of the following papers: "Pickling and Acid Dipping", Nathaniel Hall and G. B. Hogaboom, Jr.; "Solvent Vapor Degreasing", G. W. Walter; "Metal Cleaning", S. Spring; "Preparation of Various Base Metals for Plating", Walter A. Raymond; "Surface Preparation of Aluminum for Plating", J. F. O'Keefe; "Electroplating on Magnesium Alloys", Myron B. Diggin; "Preparation of Metals for Hard Chrome Plating", Arthur Logozzo; "Stripping Metallic Coatings", Nathaniel Hall, G. B. Hogaboom, Jr., and J. B. Mohler; and "Electropolishing", Charles L. Faust. (L12, L13, L17)

37-L. Plating Solutions and Operating Data. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266-270, 272, 274, 277, 278, 280, 282-284, 286-290, 293-310, 312-314, 316-318, 320-322, 324, 326-332, 334-336, 338, 340-344, 346-363.

Consists of the following papers: "Brass and Bronze Plating", G. B. Hogaboom, Jr. and Nathaniel Hall; "White Brass Alloy Plating", A. E.

Chester and Bruno Leonelli; "Cyanide Cadmium Plating", R. O. Hull; "Chromium Plating", George Dubpernell; "Acid Copper Plating", W. A. Raymond; "Cyanide Copper Plating", Henry A. Strow; "Fluoborate Copper Plating", A. E. Carlson and Clifford Struyk; "Gold Plating", Edward A. Parker; "Indium Plating", Daniel Gray; "Iron Plating", Almo D. Squitero; "Lead Plating", F. C. Mathers; "Lead-Tin Alloy Plating", A. E. Carlson and C. Struyk; "Nickel Plating", Walter H. Prine; "Bright Nickel Plating", H. Bandes; "Black Nickel Plating", John G. Poor; "High-Speed Nickel Plating From Sulfamate Baths", R. C. Barrett; "Palladium Plating", K. Schumpelt; "Platinum Plating", K. Schumpelt; "Rhodium Plating", K. Schumpelt; "Silver Plating", N. E. Promisel; "Speculum Plating", A. E. Chester and Bruno Leonelli; "Tin Plating From Acid Baths", F. C. Mathers; "Tin Plating From the Fluoborate Bath", A. E. Carlson and Clifford Struyk; "Tin Plating From Alkaline Stannate Baths", Frederick A. Lowenheim; "Plating Tin-Zinc Alloys", Frederick A. Lowenheim; "Acid Zinc Plating", R. O. Hull; "Zinc Plating From Fluoborate Solutions", A. E. Carlson and Clifford Struyk; "Cyanide Zinc Plating", R. O. Hull; and "Bright Cyanide Zinc Plating", R. R. Bair. (L17)

38-L. Special Plating Procedures. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 365-381, 383, 386, 388, 404.

Consists of the following papers: "Periodic Reverse Current Electroplating", George W. Jernstedt; "Diaphragms for Copper Plating Tanks", Ralph H. McCahn; "Plating on Plastics", Harold Narcus; "Filtration of Plating Solutions", Harold W. Faint; "Activated Carbon Treatment of Plating Solutions", Walter A. Helbig; "Purification of Plating Solutions by Low Current Density Electrolysis", C. E. Naylor; and "Deionization for Electroplaters", W. S. Morrison. (L17)

39-L. Special Surface Treatments. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 405-412, 414-428, 430-432, 434, 436, 438-440, 442-448, 450-451.

Consists of the following papers: "Sulphuric Acid Anodizing Process", Milton Nadel; "Chromic Acid Anodizing Process", G. B. Hogaboom, Jr. and Nathaniel Hall; "Coloring Anodized Aluminum", Edward Washburn; "Surface Treatments for Magnesium", Myron B. Diggin; "Coloring of Metals", George B. Hogaboom; and "Chemical Conversion Coatings for Zinc and Cadmium Surfaces", Joseph Mazia. (L14, L19)

40-L. Control-Analysis-Testing. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 453-454, 456, 458, 460-486.

Consists of the following papers: "Control of Plating Baths With Plating Cells", R. O. Hull; "Testing of Electrodeposits", Walter H. Prine; and "Nomograph on Thickness of Electrodeposits", Arthur S. Covert. (L17)

41-L. Making Additions to Plating Solutions. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 489-490.

Table gives pounds of any chemical required to bring a bath up to specifications, for various sizes of tanks. (L17)

42-L. Metal Content of Common Plating Salts. Nathan E. Promisel. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 491-492.

Table. (L17)

43-L. Determining Surface Area From the Weight of Steel Sheet Metal Parts (Stampings). *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 495-497.

Charts. (L17, G3, ST, Cu, Al)

44-L. Buffing and Polishing Wheel Speeds. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 501.

Table. (L10)

45-L. Calculating Metal Costs. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 502-509.

Charts for Cd, Zn, Sn, Cu, Ni, Cr, Ag, and Au. (L general, A4)

46-L. Architectural Letters in Metallised Plastic. D. McPherson. *Metallurgia,* v. 46, Nov. 1952, p. 249-250.

Development of metallized plastics process and typical applications. (L23)

47-L. LTF Gives Details on Bi-Metal Plate, Roller-Plating, Other Developments. *Modern Lithography,* v. 20, Dec. 1952, p. 51-52, 59, 73-74, 123.

Past developments and method for plating Cu on Al. (L17, L22, Cu, Al)

48-L. Production and Uses of Clad Steel Plate. Heinrich Canzler. *Petroleum,* v. 15, Dec. 1952, p. 326-327, 346.

Production by hot rolling. Plant design data. Photographs and tables. (L22, F23, SS)

49-L. Electropolishing and Its Applications. C. E. Naylor. *Plating Notes,* v. 4, Aug. 1952, p. 115-125.

Includes tabulated data. 14 ref. (L13, SS, Al, AY, CN)

50-L. Aluminium Coatings—A Review. T. A. Hood. *Plating Notes,* v. 4, Aug. 1952, p. 126-131.

15 references. (L general, Al)

51-L. Applications Extended for Aluminum Bonding. *Product Engineering,* v. 23, Dec. 1952, p. 134-137.

The bonding of pure Al and any of its common casting alloys, such as Alcoa 43, 122, 132, 142, 195, 220, 335, 356, to gray, malleable, ductile or nodular and austenitic irons, carbon, alloys, and stainless steels, Inconel, and Nimonic series and titanium by the Al-Fin process. Typical applications. (L22, Al)

52-L. Anodizing Aluminum With Oxalic Acid. Sakae Tajima. *Products Finishing,* v. 17, Dec. 1952, p. 42-56, 58, 60.

Development of process and present techniques. Charts and tables. 14 ref. (L19, Al)

53-L. Analyze Finish Application Troubles. Allen G. Gray. *Products Finishing,* v. 17, Dec. 1952, p. 66, 68, 70, 72, 74, 76, 78, 80.

Many common troubles encountered in painting and their remedies. Tables and diagrams. (L26)

54-L. Heating Pickle Liquor By Submerged Combustion. W. I. Weisman. *Steel,* v. 131, Dec. 15, 1952, p. 114, 116.

New type pickle liquor heater with a graphite burner for direct firing of natural gas and having long life in corrosive solutions. (L12)

55-L. (Book—French.) **(Chromium Plating: Techniques and Applications.) Chromage: Technique et Applications.** Paul Morisset. 477 pages. 1952. Marval, 31 Villa d'Allesia, Paris, 4500 fr.

Provides a summary, in a practical form suitable for industry, of published information about Cr plating. Emphasis is on engineering rather than decorative applications. Material is arranged to permit rapid reference. Divided into four parts: theory of electrolysis, technique of Cr plating, characteristic properties, and industrial applications. 243 ref. (From review in *Metallurgical Abstracts)* (L17, Cr)

56-L. (Book—German.) **(Coloring of Metal.) Metallfärbung.** Ed. 3. H. Krause. 166 pages. 1951. Carl Hanser Verlag, Munich 27, Germany. 12.50 DM.

The more important processes are treated in more detail than in former editions. Several less important phases are omitted. New developments include phosphating, Mo solutions for coloring, and coloring of light metal alloys. (L14)

57-L. (Book.) **Hot Dip Galvanizing of General Work.** 57 pages. Aug. 1951. Anglo-American Council on Productivity, 2 Park Ave., New York 16, N. Y.; or 21 Tothill St., London, S.W. 1, England.

Equipment, process, and treatment of residues. (L16, CN, Zn)

58-L. (Book.) **Metal Finishing.** 75 pages. Nov. 1951. Anglo-American Council on Productivity, 2 Park Ave., New York 16, N. Y.; or 21 Tothill St., London, S.W. 1, England.

Report of a visit to the U. S. in 1950 of a specialist team representing the British metal-finishing industry. (L general)

59-L. (Book—French.) **(Protection of Metal Surfaces Against Corrosion: Nonelectrolytic Procedures.) Protection contre la Corrosion des Surfaces Métalliques: Procédés Non-Electrolytiques.** P. Tyvaert. 86 pages. 1951. Revue d'Optique, 165 rue de Sevres, Paris 15, France.

A summary of a course given at Institut Supérieur des Matériaux et de la Construction Mécanique. Deals with preparation of metal surfaces by degreasing and by various mechanical and chemical methods for removing oxide and scale, vitreous enameling, formation of metallic coatings by various nonelectrolytic methods such as hot dipping, metal spraying, cladding, cementation, and chemical displacement, and methods of forming chemical conversion coatings on ferrous metals, Al, Mg, Zn, and their alloys. (L general)

60-L. (Book.) **Romancing in Tin Plate.** Roy Rutherford. 124 pages. 1951. Wean Engineering Co., Warren, Ohio.

Serves as a history of tin, iron, and steel and their eventual relationship in tinplate. Application in can-making and canning industries. (L17, A2, T29, Sn, Fe)

61-L. Triangular Logarithmic Net for the Calculation of Plating Thicknesses. D. R. Curry. *Electroplating and Metal Spraying,* Dec. 1952, p. 397-399.

Principle and details. (L17)

62-L. The Filtration and Pumping of Plating Solutions. Pt. 3. G. T. Colegate. *Electroplating and Metal Spraying,* v. 5, Dec. 1952, p. 401-407.

Use of anode bags, diaphragm tanks, filter press, and filter cloths. (L17)

63-L. Radiometric Evaluation of the Effectiveness of the Chromic Acid Rinse Treatment for Phosphated Work. Stanley L. Eisler and Jodie Doss. *Metal Finishing,* v. 50, Dec. 1952, p. 54-58, 69.

Results of radiometric and supplementary salt spray tests on which several solutions of varying concentrations of CrO_3 and CrO_3-H_3PO_4 were used for coating 1020 steel. Tables. (L14, R11, CN)

64-L. Properties of Electrodeposited Nickel. *Metal Finishing,* v. 50 Dec. 1952, p. 59-62.

Laboratory investigation in which cathode current efficiencies and the internal stress of deposits were de-

termined for different bath compositions and operating conditions Results showed that hardness, tensile strength, and other properties of Ni deposits can be varied over a wide range by proper choice of bath. Graphs and micrographs. (L17, Ni)

65-L. Radioactivity Helps Study of Silver Brighteners. S. E. Eaton, R. W. Fabian, and E. H. Newton. *Metal Finishing*, v. 50, Dec. 1952, p. 63-64.

Experimental work on the behavior of ammonium thiosulfate brightener in silver cyanide plating baths using radioactive sulfur as a means of detecting and measuring the thiosulfate sulfur. (L17, S19, Ag)

66-L. Lead-Clad Copper Solves an Anodizing Problem. *Metal Finishing*, v. 50, Dec. 1952, p. 65-66, 72.

Results of test on cooling capacity of Pb-clad Cu coil. (L19, Pb, Cu)

67-L. A Non-Electrolytic Smoothing Treatment for Steel. W. A. Marshall. *Metal Finishing*, v. 50, Nov. 1952, p. 78-83, 85; Dec. 1952, p. 67-69.

Part I: Method used for smoothing and etching steel samples for metallographic examination. It has potential use for etching steel articles without destroying polish prior to decorative plating. Tables, diagrams, and micrographs. Part II: adhesion of electrodeposited Ni to treated ferrous metals. (L12, L17, M21, Ni, CN, CI)

68-L. Methods for Comparative Evaluation of Paint Bonding. Metal Phosphate Pre-Treatments on Steel. Max Kronstein, Louis F. DeLong, and Alfred W. Norman. *Paint and Varnish Production*, v. 42, Dec. 1952, p. 18-27, 66.

Methods for comparing paint-bonding characteristics of phosphate pretreatments for four representative types in their stripping weight, profile, and actual paint-bonding effect under long-time salt-fog exposure and electrographic printing tests. Graphs and photographs. (L14, ST)

69-L. Phosphate Coating Progress 1945-52.2. A. R. King. *Paint Manufacture*, v. 22, Dec. 1952, p. 463-465, 472. (Concluded.)

The Rotodip method, and some cold phosphating methods for steel protection. Special features of the phosphating processes that were used in Germany during the war and which have stimulated other users to investigate this valuable aid to production efficiency. Possible future developments in this field. Tables. (L14, ST)

70-L. The Thermal Oxidation of Tin. R. K. Hart. *Proceedings of the Physical Society*, sec. B, v. 65, Dec. 1, 1952, p. 955.

Electron diffraction experiments show that when Sn foil is thermally oxidized in air an amorphous oxide layer is formed at temperatures up to 130° C. Above 130° C. only crystalline SnO and SnO_2 are formed. (L14, R2, Sn)

71-L. Zinc Economy Trials in an Industrial Hot-Dip Galvanizing Plant. D. N. Fagg and N. B. Rutherford. *Sheet Metal Industries*, v. 29, Nov. 1952, p. 1117-1125.

Economies which resulted in production of thinner and more uniform coatings and reduction in formation of residuals. Photographs, tables, and graphs. (L16, Zn, CN)

72-L. Pyrophyllite in Refractory Enamels. George J. Bishop, III. *American Ceramic Society Bulletin*, v. 31, Dec. 1952, p. 493-496.

Investigation to determine value of pyrophyllite in developing a coating which offers protection from oxidation of low-carbon steel at operating temperatures higher than organic coating can withstand. Tables. (L27, CN)

73-L. Anti-Corrosive Treatments for Magnesium. Tukasa Kawamura. *American Society for Metals*, "Proceedings of the First World Metallurgical Congress", 1952, p. 645-650.

Two improvements on the Bengough treatment of Mg by immersion in selenious acid solution. (L16, Mg)

74-L. Remarks on Spray Drying. C. Bergsoe. *Engineers' Digest*, v. 13, Dec. 1952, p. 428-430. (Translated and condensed from *De Ingenieur*, v. 64, July 18, 1952, p. 71-76)

Spray drying from point of view of design and use of spray-drying plant. 4 ref. (L26)

75-L. Advantages of Infra-Red Drying With Gas. Fred M. Reiter. *Industrial Gas*, v. 31, Dec. 1952, p. 8-10, 24-25.

Tests made on Al and steel articles. Physical penetration, low-temperature operations, and speed. Tables. (L26, Al, ST)

76-L. Changes in the Processes and Products of the Tin Plate Industry. III. (concluded.) Charles A. Ferguson. *Industrial Heating*, v. 19, Dec. 1952, p. 2301-2302, 2304, 2306, 2316.

Changes in final cleaning after tinning. Predicts some of the changes that will occur in the future. (L17, CN, Sn)

77-L. Some Recent Applications of the Metal Spraying Process. *Machinery* (London), v. 81, Dec. 12, 1952, p. 1207-1216.

General discussion including such topics as Mo coating for bonding,

metallizing machine tool shafts, reclamation of machined components, and filling of grooves and cracks. Micrographs and photographs. (L23, Mo)

78-L. Automatic Plating Plant for Motor Car Hub Caps. *Machinery* (London), v. 81, Dec. 19, 1952, p. 1281-1282.

Process includes polishing, degreasing, and plating. Photographs. (L17, CN)

79-L. Aluminum Coatings Applied to Steel by Many Methods. E. M. Smith. *Materials & Methods,* v. 36, Dec. 1952, p. 105-108.

Factors on which choice of coating depends, namely: size and shape of object, appearance desired, and service conditions. Various methods of coating. (L general, Al, ST)

80-L. Polishing Compositions. Factors Affecting the Economic Selection of Finishing Compounds. Frank Spicer. *Metal Industry,* v. 81, Dec. 19, 1952, p. 485-486.

General discussion. (L10)

81-L. Utilization of Spent Copper Electrolytes. C. C. Downie. *Mining Magazine,* v. 87, Dec. 1952, p. 334-336.

Enrichment of electrolytes and use for $CuSO_4$ production. (L17, C23, Cu)

82-L. Notes on the Electrodeposition of Thick Gold Deposits. Charles L. Bauer. *Plating,* v. 39, Dec. 1952, p. 1335-1336, 1338.

Investigation to find suitable bath for electrodeposition of Au. Au concentration, cyanide concentration, cyanide decomposition, carbonate control, and addition agents. (L17, Au)

83-L. Effect of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions. 6. The Effects and Removal of Iron. D. T. Ewing, A. A. Brouwer, and J K. Werner. *Plating,* v. 39, Dec. 1952, p. 1343-1349.

Effects of Fe as an impurity in four types of Ni plating solutions were investigated. Data which indicate accompanying changes in certain physical properties of electrolytic Ni. Graphs and tables. (L17, Ni, Fe)

84-L. Tool Finishing Costs Reduced by Wet Blasting. Eugene F. Anderson. *Tool Engineer,* v. 30, Jan. 1953, p. 53-54.

Advantages, matte finish produced, and glare reduction. Photographs. (L10)

85-L. Metal Coatings. R. A. Schaus. *Western Machinery and Steel World,* v. 43, Nov. 1952, p. 99-101, 116; Dec. 1952, p. 104-106.

Application of metal coatings to steel by hot dipping, electrolysis, cementation, welding and cladding. (L general, ST)

86-L. Infra-Red Finish Baking Tunnels Speed Production of Civilian, Military Items. Fred Burt. *Western Metals,* v. 10, Dec. 1952, p. 58-60.

Finishing layout and processes at Thermador Electrical Manufacturing Co. of Los Angeles. (L26)

87-L. Reo Adopts Hot Spray Painting. *Automotive Industries,* v. 108, Jan. 1, 1953, p. 72-73, 110.

Steps carried out at Reo Motors, Inc. for hot spray painting of sheet metal. (L26)

88-L. Slidabrading. A Faster, Cheaper Way to Precision-Finish Small Parts. Richard De Pastina. *Factory Management and Maintenance,* v. 111, Jan. 1953, p. 106-108.

Defines slidabrading, why used, how to use, costs, and what products can be slidabraded. Photographs. (L10)

89-L. Industry Gets Chemically Clean Steel Drums. *Iron Age,* v. 171, Jan. 15, 1953, p. 100-101.

Rust-inhibiting treatment previously used in automotive and appliance industries is now applied to steel drums. In nine prefinishing stages, drums are cleaned, rinsed and phosphatized to give better paint adherence and under-finish rust resistance. Residues and contaminants are completely removed. Photographs. (L14, ST)

90-L. The Effect of Temperature on the Cathode Potential During Nickel Plating. Dennis R. Turner. *Journal of the Electrochemical Society,* v. 100, Jan. 1953, p. 15-21.

Effect of temperature on cathode potential during Ni plating was studied at current densities ranging from 0.4-100 milliamp. per sq. cm. at temperatures from 20-90° C. Mathematical interpretation. Graphs. 18 ref. (L17, Ni)

91-L. Review of Recent Developments in Electroplating. H. Silman. *Metallurgia,* v. 46, Dec. 1952, p. 283-288, 298.

Substitutes for Ni plate, periodic reverse current plating, plating of Al, anodizing, plating of Mg, electroplating and filtration plants, plastics in plating, electropolishing and chemical polishing, effluent disposal, and cleaners. 28 ref. (L17, L13, Al, Mg, Ni)

92-L. Colorless Lacquers. J. Towner. *Plating,* v. 40, Jan. 1953, p. 48, 58.

Applications of lacquers to ferrous and nonferrous metals to promote adhesion, provide filling, and present aesthetic appeal and weather protection. (L26)

93-L. Artistic Finishes on Lamps. Frank L. Bonem. *Products Finishing,* v. 17, Jan. 1953, p. 20-27.

Cu, brass, and Ag plating, brush finishing, lacquering, enameling, and staining are utilized to achieve striking finish that is trademark of the Rembrandt Lamp Corp. Photographs. (L general, Cu, Ag)

94-L. Vacuum Metallization of Plastics. George Bancroft. *Products Finishing,* v. 17, Jan. 1953, p. 30-32, 34.

Vacuum vapor plating of metals and plastics with metal coatings, Al being most popular for plating. Use of lacquer. (L23, Al)

95-L. Flame Plating. *Screw Machine Engineering,* v. 14, Jan. 1953, p. 37-39.

Method developed for plating with powders, such as tungsten carbide. Photograph. (L22, W, C-n)

96-L. Porcelain Coatings: Ingenuity Is the Progress Factor. W. A. Barrows. *Steel,* v. 132, Jan. 12, 1953, p. 72-74.

Advantages of using porcelain coatings. Warns against coating nonferrous metals and gives precautions for welding. (L27, K general, EG-a)

97-L. Oil Mist Tames Tinning Problems. *Steel,* v. 132, Jan. 12, 1953, p. 80, 82.

Use of oil mist lubrication which prevents loss of time and lowers cost by not contaminating tinning baths with grease. (L16, Sn)

98-L. A Study of the Behaviour of Polarized Electrodes. Part 3. The Behaviour of the Silver/Silver Chloride System During Electrolytic Reduction. G. W. D. Briggs and H. R. Thirsk. *Transactions of the Faraday Society,* v. 48, Dec. 1952, p. 1171-1178.

Electrochemical methods supplemented by microscopy were used to study rdeuction of anodically formed films of CaCl on Ag. Efficiency of anodic and cathodic processes was investigated. Diagrams, graphs, tables, and micrographs. 8 ref. (L17, Ag)

99-L. (French.) **The Diffusion of Ions Through Metallic Coatings.** Maurice Bonnemay, Helmy Makram, and Jean Royon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Oct. 17, 1952, p. 955-957.

Principle of testing porosity of electrolytic Cu deposits by utilizing radioactive tracers. (L17, S19, Cu)

100-L. (German.) **Thin Sheet Galvanizing and Processing Into Corrugated Sheet Iron and Shapes.** H. Rückemesser. *Metall,* v. 6, Nov. 6, 1952, p. 695-699.

Shop diagrams and description. Details of the manufacturing process. Photographs. (L16, CN, Zn)

101-L. (German.) **Factors of Current Utilization in Electropolishing Baths.** A. Wogrinz. *Metalloberfläche,* ser. B, v. 4, Nov. 1952, p. 161-162.

Significance and various calculations concerning factor of current distribution. Details of Wolfram's experiments. (L13)

102-L. (German.) **The Improvement of the Properties, Especially of the Scattering Capacity, of Nickel Baths by Means of Sulfurous Acid and Its Salts.** H. Komusaari. *Metalloberfläche,* ser. 3, v. 4, Nov. 1952, p. 162-163.

Experiments for depositing Ni in areas of low current density and yet preserve luster. Details of composition of the bath. (L17, Ni)

103-L. (German.) **Fundamental Problems of Lacquering of Sheet Iron and Metal Castings.** Fritz Reichel. *Metalloberfläche,* ser. B, v. 4, Nov. 1952, p. 164-166.

Various processes for achieving optimum surface effects. (L26, CN)

104-L. (German.) **Pickling as a Preparation for Surface Finish.** (Concluded) R. Petri. *Metalloberfläche,* ser. A, v. 6, Nov. 1952, p. 170-174.

Changes in material during pickling, and role of these changes for formation of electrolytic coatings. Micrographs. (L12)

105-L. (German.) **Electric Welding of Hard Facings to Rails.** Franz Novotny. *Schweisstechnik,* v. 6, Oct. 1952, p. 109-114.

Because of varying behavior of rails from different heats it was found desirable to hard face both inner and outer rails. (L24, CN)

106-L. (Book-Dutch.) **(Contribution to the Theory of the Chromium Plating Process.) Bijdrage Tot De Kennis Van Het Verchromen.** Johan Wessel Holleman. 56 pages. 1952. Uitgeverij H. J., Paleisstraat 76, Antwerp, Belgium.

Mechanisms of processes that occur in Cr plating baths. Effects of various additives and catalysts. 47 ref. (L17, Cr)

107-L. (Book.) **Magnesium Finishing.** 140 pages. 1952. Dow Chemical Co., Midland, Mich.

Finishing systems, surface stability and treatment, mechanical finishing, chemical treatments, painting, and assembly protection. (L general, Mg)

108-L. (Book.) **Metal Finishing Guide book Directory.** 556 pages. 1953. Finishing Publications, 381 Broadway, Westwood, N. J. $3.00.

Basic material is same as in previous editions. Latest developments in techniques and equipment are included. (L general)

109-L. Flaking of Hot Dipped Zinc Coatings. *British Steelmaker,* v. 19, Jan. 1953, p. 20-21.

Briefly discusses cause. (L16, Zn)

110-L. Wear-Resisting Phosphate Coatings on Steel. *Engineering,* v. 175, Jan. 9, 1953, p. 57.

"Parkerizing" and "Bonderizing" processes for phosphating ferrous and nonferrous metals and alloys. Micrographs. (L14)

111-L. Conveyorized Cleaning and Coating of Aluminum Windows. S. K. Jordan. *Industrial Finishing,* v. 29, Jan. 1953, p. 20-22, 24.

Plant layout and procedure for coating Al windows with a clear water-white methacrylate type lacquer. Photographs and diagram. (L26, Al)

112-L. How to Cut the Cost of Finishing Your Product. C. Raymond Syer, Sr. *Industrial Finishing,* v. 29, Jan. 1953, p. 28-30, 32, 34, 36-37.

Selection of equipment, removal of scale, dust, tar, and heavy soil; setting up and maintaining process controls; features of cleaning and phosphating machine; and evaluation tests and cost data. (L12, L14)

113-L. Traveling Spray Booths Used in Painting Pullman Cars. J. W. Limbrock. *Industrial Finishing,* v. 29, Jan. 1953, p. 40-42, 44, 46.

Use and advantages of using movable spray equipment. (L26)

114-L. Modern Plating Equipment is Designed for Any Shop. Plating Barrels and Tanks. John E. Hyler. *Iron Age,* v. 171, Jan. 22, 1953, p. 95-100.

Advantages of using barrel and tank plating methods for small pieces. Photographs. (L17)

115-L. Making Mould Cavities by Electro-Deposition. *Machinery* (London), v. 82, Jan. 16, 1953, p. 95-101.

Methods employed in production of a variety of tools having electroformed cavities. (L18)

116-L. Carbide Hardfacing by New Inert-Gas-Arc Method. J. J. Barry. *Materials & Methods,* v. 37, Jan. 1953, p. 80-81.

Process in which tough, wear resistant coatings are deposited on steel. Advantages include: automatic, fast deposition; shallow heat-affected zone; good bonding; and little dilution of carbide particles. Photographs. (L24, ST, C-n)

117-L. Designations and Applications of Chemical and Electrochemical Treatments for Magnesium Alloys. *Materials & Methods,* v. 37, Jan. 1953, p. 121.

Tabulated information on cleaning and coating. (L general, Mg)

118-L. Cold Flow of Pipe Coating Bitumens. Charles E. Lee. *Pipe Line News,* v. 25, Jan. 1953, p. 64, 66, 68.

New methods being used to predict the suitability of bitumens for pipe coating service and for quality control of shipments. (L26)

119-L. Descaling. A Review of Methods in Use in France and Particularly of the Gorcy System. André Liné. *Wire Industry,* v. 20, Jan. 1953, p. 66, 69-70, 83.

Includes features of the Gorcy system, drawing descaled wire, and subsequent processing of the wire. Diagrams. (L10, F28)

120-L. Economies in the Use of Zinc Can be Brought About by Careful Operation and Well Planned Processes. Hans Ruckemesser. *Draht* (Wire) (English Ed.), Dec. 1952, p. 40-41.

Discusses relative advantges of wet and dry galvanizing. (L16, CN)

121-L. (German.) **On the Theory and Precomputation of the Cathode Current Distribution in Plating Electrolytes.** Julius Steiner. *Zeitschrift für Physikalische Chemie,* v. 200, July 1952, p. 53-69.

Current distribution can be figured from the conductivity and the potential current density curve, using a simple formula determined empirically for each type of electrode and bath. Chemical composition of electrodes does not need to be known. 22 refs. (L17)

122-L. Properties of Steel for Enameling. Part II. M. B. Gibbs and F. R. Porter. *Finish,* v. 10, Jan. 1953, p. 24-25, 92.

General properties of base metals. (L27, CN)

123-L. Protective Coatings for Die Casting Dies. W. M. Halliday. *Canadian Metals,* v. 16, Jan. 1953, p. 28-30.

Several economical, effective, and simply applied die coatings; advantages to be gained from use on Sn, Pb, mild steel, and Zn-base alloys. (L general, E13, Sn, Pb, CI, Zn)

124-L. Electrolytic Process Removes Discoloration in Stainless Welds. *Industry & Welding,* v. 26, Feb. 1953, p. 50, 52, 54, 91.

A simple, fast, and economical method of removing heat discoloration from welded areas. Photographs. (L13, K general, SS)

125-L. A Designer's Guide to Vitreous Coatings. (Concluded.) Robert L. Stedfeld. *Machine Design,* v. 25, Jan. 1953, p. 141-149; Feb. 1953, p. 166-176.

Summarizes service properties including optical properties, acid and corrosion resistance, thermal and

mechanical properties, and miscellaneous basic properties. Part II: Metal selection, enamel processing, and design for enameling. Tables and graphs. 19 ref. (L27, Fe, EG-a)

126-L. (French.) Electrolytic Cleaning and Its Applications. I. Epelboin. *Revue de Métallurgie,* v. 49, Dec. 1952, p. 863-874.

Methods and bath compositions. Effects of electrolytic polishing on mechanical, electrical, and magnetic properties of materials. (L13, Q general, P15, P16, Co, Pb, Fe, Ni, Sn)

127-L. (German.) New Methods for the Surface Protection of Zinc and Tin. *Werkstoffe und Korrosion,* v. 3, Dec. 1952, p. 460-461.

Chromate layers, KFeCn treatment, and anodic treatments for protection of Zn. Anodic oxidation in weak NH_4OH and black coloring of Sn and Sn alloys in various solutions. (L14, L19, Zn, Sn)

128-L. Wash Primers for Magnesium. A. R. Hempel, H. W. Lasch, G. Schurr, and M. van Loo. *American Paint Journal,* v. 37, Feb. 16, 1953, p. 76, 78, 80, 82, 84.

Certain wash primers can be formulated to exhibit good adhesion, low blistering tendency resulting from H_2 evolution during application, and good corrosion resistance as primers over bare Mg. Tables. (L14, Mg)

129-L High Temperature Ceramic Coatings for Chemical Use. W. A. Barrows. *Finish,* v. 10, Feb. 1953, p. 24-26.

Base metals, type of coating, design, and fabrication must be considered for successful ceramic coatings. Photographs. (L27)

130-L. Finishing Parts for Central Heating Units in a 15-Minute Cycle. Sutton Kinter. *Finish,* v. 10, Feb. 1953, p. 32-33, 80, 82.

Degreasing operation and use of infra-red oven. (L12, CN)

131-L. Phosphating—Plant Requirements. A. W. Putnam. *Metal Industry,* v. 82, Jan. 30, 1953, p. 89-92.

Successive stages for each operation of the process followed in the plant. (L14)

132-L. Finishing Refrigerators With Hot Sprayed Enamel. Frank L. Bonem. *Products Finishing,* v. 17, Feb. 1953, p. 24-32, 34.

Finishing operations on Philco refrigerators employing synthetic enamel. Photographs. (L27, CN)

133-L. The "Why" of Modern Polishing Abrasives. Henry R. Power. *Products Finishing,* v. 17, Feb. 1953, p. 44, 46, 48, 50.

Characteristics necessary for polishing abrasives. (L10)

134-L. Chromium Plating Methods. Allen G. Gray. *Products Finishing,* v. 17, Feb. 1953, p. 58, 60, 62, 66, 68, 72, 74, 76, 78, 80, 82.

Finishing gages, surface preparation for hard Cr plating, plating Cr on Cr, effect of Cr plating on fatigue strength, self-regulating high-speed Cr plating bath, method used for fatigue testing at University of Michigan, and Bureau of Standards chrome plating endurance tests. (L17, Q7, Cr)

135-L. Experiments on Zinc Recovery From Residues and the "Quality" of Recovered Metal. N. B. Rutherford. *Sheet Metal Industries,* v. 30, Feb. 1953, p. 119-134.

Emphasis was placed on simple methods of treatment which can easily and immediately be applied by even small general galvanizing firms. Photographs and tables. 27 ref. (L16, A8, Zn)

136-L. Plating on Aluminum. *Steel,* v. 132, Feb. 16, 1953, p. 76-78.

Recent studies show how to smooth out production line difficulties and improve corrosion resistance of plated products. Zincate pretreatment. Photographs. (L17, Al)

137-L. Shot Blasts 430 Cleaning Costs. *Steel,* v. 132, Feb. 16, 1953, p. 86, 89.

Shot-blast cleaning machine placed on strip annealing and pickling line saves time and gets more uniform product. (L10, SS)

138-L. Selection and Evaluation of Methods of Hard Facing. J. J. Barry. *Welding Journal,* v. 32, Feb. 1953, p. 119-126.

Includes welding methods of applying hard facing materials, oxy-acetylene method, electric arc method, submerged and open arc methods, carbon arc, H_2 method, inert-gas-shielded method, and automatic hard facing of tool joints with W carbide. Micrographs and photographs. (L24, CI, W, C-n)

139-L. (Pamphlet.) Painting Practice for Aluminium. Aluminium Development Association (London), Information Bulletin No. 20, Dec. 1952, 19 pages.

Broad survey which shows that painting of Al largely follows established practice for other metals with certain modifications to suit particular material. Also deals with cleaning and degreasing, pretreatment where necessary, choice of paint system, single coat systems, multi-coat systems, and repainting of small and large components and structures. (L26, Al)

140-L. (Book—German.) **(Nonmetallic Inorganic Coatings.) Nichmetallische anorganische Uberzüge.** Willi Machu. 404 pages. 1952. Springer-Verlag, Vienna, Austria $13.50.

Nonmetallic inorganic coatings for protection of metals against corrosion, and for purposes of improving appearance of metals. Sections on anodic coatings for light metals, metal coloring, phosphate coatings, enamels. (L14, L19, L27)

141-L. Processing Silverplate. *Canadian Chemical Processing,* v. 37, Feb. 1953, p. 36, 38, 40.

Cleaning, buffing, and plating; with accent on mechanization and automatic equipment. Photographs. (L17, Cu, Ag)

142-L. Electrodeposition of Zinc-Tin Alloy. A Summary of Recent Work in Italy. *Chemical Age,* v. 68, Feb. 7, 1953, p. 253-254.

Preliminary study of Zn and Sn-plating baths, each containing free cyanide and NaOH, which result in an electrolyte when they were mixed but retain characteristics of separate baths. (L17, Zn, Sn)

143-L. Glassed Steel. E. A. Sanford and O. J. Britton. *Chemical Engineering,* v. 60, Mar. 1953, p. 294, 296, 298, 300, 302-304.

Properties of glass-coated steel and resistance to a number of corrosives. Diagrams and photographs. (L27, CN)

144-L. Painting Metal Containers Electrostatically. Sam Lodovico. *Industrial Finishing,* v. 29, Feb. 1953, p. 26-28, 30-31.

Metal cleaning, rustproofing, infrared dry-off, electrostatic spraying of heated materials, and convection oven baking in conveyerized setup for spraying protective coatings over inside and outside surfaces of two kinds of sheet steel containers. Photographs. (L26, CN)

145-L. High Temperature Ceramic Coatings Have Double Importance. P. M. Klauber. *Industrial Gas,* v. 31, Feb. 1953, p. 3-5, 27-28.

Use of ceramic coatings for jet parts which must withstand high-temperature oxidation and corrosion. (L27, R2, AY)

146-L. Can You Use These New Metal Finishing Ideas? *Iron Age,* v. 171, Feb. 26, 1953, p. 132-136.

Disposal of waste solutions, chemical polishing of Al, and radioactive tracers. Photographs. 50 ref. (L14, S19, A8, Al)

147-L. Oscillographic Polarographic Waves for the Reversible Deposition of Metals on Solid Electrodes. Talivaldis Berzins and Paul Delahay. *Journal of the American Chemical Society,* v. 75, Feb. 5, 1953, p. 555-559.

Equation is derived. Theoretical results are compared with experimental data, and discrepancies are accounted for by variations of activity of deposit. (L17, Cd)

148-L. Quality Control Applied to Metal Finishing. Alan Whittaker. *Machinery,* v. 82, Feb. 6, 1953, p. 254-255.

General discussion of process control, suitability of plant, personnel, supervision, and inspection. (L general)

149-L. Operation of Hot Air Baking Equipment. Leo Walter. *Organic Finishing,* v. 14, Feb. 1953, p. 9-12.

Efficiency of drying can be achieved or increased with existing baking equipment, if theory of hot air drying of coatings is understood. Diagrams. (L26)

150-L. Pipe Protection With Unbonded Coatings. Richard Sneddon. *Petroleum Engineer,* v. 25, Feb. 1953, p. D12, D14, D16.

Advantages of using two separate coats with no bond between, which neutralizes shear stresses and lateral shocks. (L26, CN)

151-L. Electro-Deposited Rhodium. *Times Review of Industry,* v. 7, Feb. 1953, p. 30.

Development of Rh as an industrial finish. (L17, Rh)

152-L. Design of an Oil Fired Galvanizing Furnace. William D. Bawden. *Wire and Wire Products,* v. 28, Feb. 1953, p. 151-154, 222.

Procedure for determining size, shape, and design of pots and furnaces. Photographs and tables. 6 ref. (L16, Zn)

153-L. (French.) **Contribution to the Knowledge of Processes for the Electrolytic Polishing of Metals.** R. Piontelli and G. Bianchi. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 160-196; disc., p. 196-197.

Experiments in which technique is based on cylindrical form of cell, thus assuring a uniform current density; liaison of anode with a reference electrode so as to form a "tensiometric pile" whose e.m.f is measured or recorded separately; temperature control; and electric supply to assure a constant current density. Theoretical discussion, diagrams, and tables. 11 ref. (L13)

154-L. (German.) **Practical Application of the Metal-Spraying Process in Foundries.** H. Reininger. *Giesserei,* v. 39, Dec. 25, 1952, p. 673-678.

Coating of foundry equipment by metalizing gives good corrosion protection. Shows that metal model plates can be improved by spraying and life of apparatus exposed

to extreme heat is lengthened. Photographs and micrographs. 14 ref. (L23, E general)

155-L. (German.) The Surface of Electrolytically Polished Magnesium. K. Huber and H. Flückiger. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 123-126; disc., p. 126-127.

Electrolytically polished surfaces may be examined by using either lacquer or polystyrol. These two processes are compared. (L13, Mg)

156-L. Electric Heat Pays Off for Galvanizing. John S. Case and G. H. Hoffman. *Electrical World,* v. 139, Mar. 9, 1953, p. 96-97.

Installation and advantages of electrically heated galvanizing kettles. Products receive more uniform finish and kettle failures are eliminated. (L16, Zn)

157-L. Pickling and Bright Dipping of Copper and Copper-Rich Alloy Components. E. E. Halls. *Electroplating and Metal Finishing,* v. 6, Jan. 1953, p. 43-50.

Effect of different acids and acid mixtures and most suitable treatments for specific purposes. Tables. (L12)

158-L. New Flame Plating Process Protects Metal Parts From Wear, Abrasion. *Industry & Welding,* v. 26, Mar. 1953, p. 90, 92-95.

Process whereby steel, cast iron, Al, Cu, bronze, Ti, and Mg can be coated with powdered WC. Discusses elasticity, thermal, and mechanical shock resistance of the coating. Photographs.
(L22, CI, Al, Cu, Ti, Mg, W, C-n)

159-L. Coatings for Steel Water Pipe. Walter H. Cates. *Journal American Water Works Association,* v. 45, Feb. 1953, p. 103-112.

Assembles and summarizes present knowledge on effectiveness and approximate cost of available coating materials. Discussion is confined to steel water pipe 4 in. or more in diameter. Tables. 15 ref. (L26, CN)

160-L. Cement-Mortar Linings and Coatings for Steel Pipe. R. C. Kennedy. *Journal American Water Works Association,* v. 45, Feb. 1953, p. 113-115.

Process for applying coatings and principal characteristics for the pipe. (L26, CN)

161-L. Antifouling Paints for Aluminum Alloys Used in Shipbuilding. John C. Kingcome. *Light Metals,* v. 16, Feb. 1953, p. 48-52.

Reviews development of antifouling paints used in England and by U. S. Navy. Photographs. 12 ref. (L26, R4, Al, Zn, Cu, Hg)

162-L. Phosphating. Performance and Control. R. J. Brown. *Metal Industry,* v. 82, Feb. 1953, p. 125-128.

Type of cleaner and rinse solutions. Some problems likely to occur. Photographs. (L14)

163-L. Small Parts Barrel Through Plating. Herbert Chase. *Steel,* v. 132, Feb. 23, 1953, p. 88-90.

Three automatic barrel machines which form backbone of Zn plating line. (L17, Zn)

164-L. Flame-Plating Hikes Wear Life of Base Metal. Opens New Field for Utilizing Tungsten Carbide. *Western Metals,* v. 11, Feb. 1953, p. 56-58.

Applications of the process in machine tool or manufacturing industry. Photographs. (L17, W, C-n)

165-L. Kel-F Applications in Corrosive Systems. Louis C. Rubin and Wilber O. Teeters. *Corrosion,* v. 9, Mar. 1953, p. 100-102.

Plastic coatings for metals exposed to corrosive systems. (L26)

166-L. Electronics Enter Porcelain Enameling Field. J. L. McLaughlin. *Finish,* v. 10, Mar. 1953, p. 30-31, 95-96.

Progress report on use of electrostatic spraying for porcelain enameling of appliance parts. Promising work was done and successive trials showed consistent improvements. Photographs. (L27, CN)

167-L. Blast Cleaning Sanitary Ware Castings. Eugene F. Anderson. *Finish,* v. 10, Mar. 1953, p. 42-43.

How a Canadian manufacturer cleans castings prior to enameling. Photographs. (L10)

168-L. Electrodeposition of Tin-Nickel Alloy Plate From Chloride-Fluoride Electrolytes. J. W. Cuthbertson, N. Parkinson, and H. P. Rooksby. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 107-119.

Laboratory research. Tables and graphs. (L17, Sn, Ni)

169-L. Electrodeposition Behavior of Cadmium and of Thallium at Mercury Cathodes. L. B. Rogers and Charles Merritt, Jr. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 131-135.

Deposition behavior from approximately millimolar solutions of Tl and Cd at a Hg cathode can be predicted within 10 mv from polarographic data. Tables. (L17, Tl, Cd)

170-L. Wet Blasting for Precision Surfacing and Finishing Operations. Eugene F. Anderson. *Machine and Tool Blue Book,* v. 49, Mar. 1953, p. 162-164, 166, 168, 170-174.

Process which results in better surface qualities and less manual labor. (L10)

171-L. Life of Metal Plungers Increased by Hard-Facing. L. V. LaRou. *Machine and Tool Blue Book,* v. 49, Mar. 1953, p. 227-230.

Briefly describes process and compares advantages with those of untreated cast iron. Photographs. (L24, CI)

172-L. Alkaline Cleaning for Metal Finishing. Allen G. Gray. *Metal Progress,* v. 63, Feb. 1953, p. 84-87.

Discusses alkali cleaning with respect to soak tank, electrolytic, and spray cleaning. Tables and diagrams. (L12)

173-L. Investigation of Gases Evolved During Firing of Vitreous Coatings on Steel. Dwight G. Moore and Mary A. Mason. *National Advisory Committee for Aeronautics,* Technical Note 2865, Jan. 1953, 34 pages.

Investigation included examination of gas evolution during firing, changes in bubble structure with firing time, and changes in normal gas evolution when waterfree enamels were used. Analysis of gases trapped in bubble structure after varying firing times; source of C gases in bubble structure using C^{14} as a tracer; and effect of various pretreatments on resulting bubble structure of fired specimens were determined. Tables. (L27, ST)

174-L. A Theory of Hydrogen Overvoltage and Its Relation to the Electrodeposition of Metals. George Dubpernell and Roberta Dubpernell. *Plating,* v. 40, Jan. 1953, p. 53-58; Feb. 1953, p. 151-154, 159.

Theory of H_2 overvoltage is proposed and it is suggested that it is not due to H_2 but to electrodeposition of electronegative metal impurities such as Na. History of subject is reviewed, and an explanation is offered of the bonded structures frequently exhibited by bright electrodeposits. Relation to electrodeposition of metals and structure of deposits. Graphs and tables. 70 ref. (L17)

175-L. Selenium Rectifiers for Electroplating. F. A. Waelterman and L. W. Reinken. *Plating,* v. 40, Mar. 1953, p. 254-259.

Manufacture of Se rectifier cells and stacks. Concludes with brief description of complete power supply units incorporating Se stacks. Photographs. (L17, Se)

176-L. Polarographic Determination of Lead in Lead Plating Solutions. Rafael Diaz. *Plating,* v. 40, Mar. 1953, p. 261-262.

Reagents, apparatus, and procedure. Method is compared with gravimetric methods. (L17, S11, Pb)

177-L. Comments on the Finishing of Titanium. John Starr. *Products Finishing,* v. 17, Mar. 1953, p. 38-40, 42.

Problems encountered and suggests satisfactory methods for cleaning Ti. (L general, L12, Ti)

178-L. How to Select a Surface Active Agent for Use in Metal Cleaning. Allen G. Gray. *Products Finishing,* v. 17, Mar. 1953, p. 46, 48, 50.

Brief description with emphasis on detergency. (L12)

179-L. Plating With the Platinum Group Metals. Allen G. Gray. *Products Finishing,* v. 17, Mar. 1953, p. 50, 52, 54, 58, 60, 62, 66.

Uses, plating baths, and procedure for Rh, Pt, and Pd. (L17, Rh, Pt, Pd)

180-L. Cold Cleaner Cuts Costs. D. C. Miner. *Steel,* v. 132, Mar. 16, 1953, p. 100-101.

New combination of alkali-solvent-wetting agent is effective in power washers at room temperature. Mixture is particularly suited for light cleaning jobs with no encrusted oils. Photographs. (L12)

181-L. (French.) **Cleansing and Preparation of Metallic Surfaces, Particularly Cast Iron.** J. Guingand and J. Ginguené. *Métaux Corrosion—Industries,* Nov. 1952, p. 463-471.

Discusses Kolene-Heurtey and other electrical processes. (L12, CI)

182-L. (Book.) **Journal of the Electrodepositors' Technical Society.** v. 27. 337 pages. Institute of Metal Finishing, 32, Great Armond St., London, W. C. 1. 42s, 0d.

Consists of papers covering tin and tin-plating; surface defects in steel; discontinuities in metallic coatings; crystal structures of deposits; corrosion resistance; design of automatic plating plant; bright tin-nickel plating; plating tube bores; zincate process for Al; analysis of solutions by chromatography; and several others. (L17, M26, R general, Sn, CN, Al, Zn)

183-L. (Book—French.) **International Committee of Electrochemical Thermodynamics and Kinetics. "Proceedings of the Third Meeting, Berne 1951".)** Comité International de Thermodynamique et de Cinetique Electrochimiques. "Comptes Rendus de la III° Reunion". 495 pages. 1952. Carlo Manfredi, Milan, Italy.

Consists of individual papers on electrochemical behavior of metals and metalloids; electric double layer; electrochemical nomenclature and definitions; and organization of the committee. Papers are abstracted individually. (L17, P15)

184-L. The Protection of Steel Structures in Salt Atmospheres. (Condensation.) H. E. Bright. *Australasian Engineer,* Jan. 7, 1953, p. 69-71.

Tests for proving relative value of three types of surface preparation, two primers, and two types of synthetic resin vehicles for cover coats of paint. (L26, CN)

185-L. The Manufacture and Properties of Clad Steel Plates. T. T. Watson. *Blast Furnace and Steel Plant,* v. 41, Mar. 1953, p. 318-320, 326-327, 351, 354-355.

Facilities required for processing clad metals and carbon steels. Micrographs and tables. (L22, AY, CN)

186-L. The Filtration and Pumping of Plating Solutions. G. T. Colegate. *Electroplating and Metal Finishing,* v. 6, Jan. 1953, p. 11-13; Feb. 1953, p. 51-53, 55-57; Mar. 1953, p. 85, 87-89, 91, 93-94.

Part 4 describes, diagrams, and illustrates precoated filters. Part 5: Precoating, uncoated filter packs, candle and sleeve-type filters, and auxiliary equipment. Part 6: The different pumps which are used. Diagrams and photographs. (L17)

187-L. Influence of Bath Composition and Operating Conditions in Modern Silver Plating. *Electroplating and Metal Finishing,* v. 6, Mar. 1953, p. 83-84.

Influence of various components of the Ag bath on cathode polarization, maximum permissible current density, gloss, and smoothness of coating. Conclusions regarding optimum composition and operating conditions for producing moderately thick Ag deposits. Graphs. (L17, Ag)

188-L. "Pinholing" and "Boiling" in Enamelled Light-Iron Castings. E. Holland. *Foundry Trade Journal,* v. 94, Mar. 5, 1953, p. 273-279.

Trial and error approach for determining reasons for rejects which occur in enamelling light iron castings. Photographs, micrographs, and tables. (L27, CI)

189-L. Brushes. Production Tools for Good Surface Finishes. R. O. Peterson. *Iron Age,* v. 171, Mar. 19, 1953, p. 134-137.

Brushing can remove burrs, slivers, and other surface imperfections without appreciably changing the shape or dimensions of a part. Brush flexibility permits controlled blending of surface irregularities. Factors involved in brush selection. Photographs. (L10)

190-L. Recent Developments in Paint. Rolt Hammond. *Machinery Lloyd* (Overseas Ed.), v. 25, Feb. 28, 1953, p. 73-75, 77, 79-80.

Paints and coatings developed to prevent corrosion of ferrous and nonferrous materials. Photographs. (L26)

191-L. Water Impurities and Electroplating. James Boyd Smith. *Metal Finishing,* v. 51, Feb. 1953, p. 69-72, 74; Mar. 1953, p. 65-69.

Effect of water impurities on various plating baths. Water treatment processes applicable to removing impurities. Diagrams and photographs. 68 ref. (L17)

192-L. Manufacturing Name Plates. R. E. Pettit. *Metal Finishing,* v. 51, Mar. 1953, p. 60-64, 81.

Etching, anodizing, and plating operations. Photographs. (L12, L17, L19)

193-L. Surface Finishing the Stainless Steels. Lester F. Spencer. *Metal Finishing,* v. 51, Mar. 1953, p. 70-77.

Equipment used in grinding, polishing, and buffing stainless steel. Photographs and tables. (L10, G18, SS)

194-L. Effects of Air Agitation in Sulfuric Acid Anodizing. R. C. Spooner. *Metal Finishing,* v. 51, Mar. 1953, p. 78-81.

Air agitation alters temperature at areas where anodic film is being formed and influences the characteristics of the anodic coating. Graphs and tables. (L19, Al)

195-L. Temperature in Electroplating Practice. J. Liger. *Metal Finishing,* v. 51, Mar. 1953, p. 82-83.

Extended English abstract from *Galvano,* Paris, v. 21, p. 15-17. Relevant factors involved in connection with effect of temperature on the plating bath. (L17)

196-L. Acidproof Cement Lining Halts Corrosion in Vacuum Flasher Column. D. H. Stormont. *Oil and Gas Journal,* v. 51, Mar. 23, 1953, p. 255-257.

Advantages and process of applying acidproof cement which prevents high temperature corrosion by sulfur. Photographs. (L26)

197-L. Preventing Metallic Corrosion by Modern Painting Techniques. H. W. Rudd. *Paint Manufacture,* v. 23, Feb. 1953, p. 41-44, 63; Mar. 1953, p. 77-80, 93.

Development of paint systems to combat corrosion of iron and steel. Methods for removal of mill scale, and recent developments that have taken place in priming formulations. Necessity of using media of low water permeability for top coats, and employment of cathodic protection methods in conjunction with paint systems. 17 ref. (L26, R10, ST)

198-L. Nonionics. The All-Surface Cleaners. Manuel N. Fineman. *Soap and Sanitary Chemicals,* v. 29, Feb. 1953, p. 46-49; Mar. 1953, p. 50-53, 114.

Dynamic detergency test, preci-

sion of test, and differences between ionics and nonionics. Use for metal and glass surfaces. Wetting phenomena, performance on different substrates, alkaline salts, and blends. Graphs and photographs. (L12)

199-L. Drums Come Clean and Rust-Inhibited. *Steel,* v. 132, Mar. 23, 1953, p. 84.

Cleaning and phosphating process provides chemically clean and protectively coated drums that hold their finish longer. (L12, L14, ST)

200-L. Surface Impregnation of Plain Carbon Steel With Tungsten or Molybdenum From Salt Baths. E. Fitzer. Henry Brutcher Translation 2975, 23 pages.

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 969-L, 1952. (L15, J28, CN, CI)

201-L. (French.) Electrolytic Cadmium Plating. J. Liger. *La Métallurgie et la Construction Mécanique,* v. 84, Dec. 1952, p. 969, 975; v. 85, Jan. 1953, p. 58-59

Part 1: A general discussion comparing Cd with Zn plating. Part 2: Cd plating baths and surface preparation. (L17, Cd)

202-L. (French.) Some Uses of Silicones in the Production of Heat Resistant Materials. P. H. Morel. *Métaux Corrosion-Industries,* v. 27, Dec. 1952, p. 511-514.

Types and properties of silicones, their uses in aviation, enamels for light alloys, and molding powders. (L27, E19, SG-h)

203-L. Cronak Treatment Simplified. *American Pressman,* v. 63, Mar. 1953, p. 20, 22.

Treatment of Zn plates to prevent oxidation. (L14)

204-L. How We Finish Steel Kitchen Cabinets. Edward Schneider. *Industrial Finishing,* v. 29, Mar. 1953, p. 28-30, 32, 34.

Equipment layout, operations performed, tests made, and conditions maintained. Photographs. (L general)

205-L. Cleaning, Painting, and Lithographing Steel Drums. Ralph H. Gieser, Jr. *Industrial Finishing,* v. 29, Mar. 1953, p. 68-70, 72, 74, 76, 78.

Process for painting heavy-gage steel sheets before they are formed. Photographs. (L26, CN)

206-L. Anodic Polarization of Passive and Non-Passive Chromium-Iron Alloys. Herbert H. Uhlig and Glenn E. Woodside. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 280-283.

Data for 0-16.7% Cr-Fe alloys in 3% Na_2SO_4. Critical current densities are given for passivity accompanied by sudden reduction of anodic dissolution and a pronounced noble potential range from 150 ma. per sq. cm. for iron to 0.05 ma. per sq. cm. for 11.6% Cr. Graphs and tables. (L19, Fe, SS)

207-L. Heavy Rhodium Electroplates Now Possible. Alfred M. Weisberg. *Materials & Methods,* v. 37, Mar. 1953, p. 85-87.

Rh can be deposited on most common metals and provides excellent corrosion and water resistance. (L17, R4, Rh)

208-L. Defects in Barrel and Drum Plating. O. Niedermeyer. *Metal Finishing,* v. 51, Mar. 1953, p. 82.

Previously abstracted from *Metalloberfläche.* See item 362-L, 1952. (L12, L16, CN, Zn)

209-L. Black Oxide Applied in Rotating Barrel. *Metal-Working,* v. 9, Apr. 1953, p. 4-5.

Process for cleaning and finishing steel parts. (L12, L14, ST)

210-L. For Aluminum. Colorful Vitreous Enamel. *Modern Metals,* v. 9, Mar. 1953, p. 80-83.

Physical qualities of enamels, method of application, pretreating Al stock, enameling procedure, advantages, disadvantages, and market prospects. Photographs. (L27, Al)

211-L. For Magnesium. A New Anodic Coating. H. K. De Long. *Modern Metals,* v. 9, Mar. 1953, p. 90, 92.

Process which produces abrasion resistant coating and can be applied to standard alloys as well as unalloyed Mg. Tables. (L19, Mg)

212-L. Industrial Painting of Aluminium Products. H. J. Testro. *Paint Manufacture,* v. 23, Mar. 1953, p. 86-89, 93.

Suitable methods of surface preparation for Al and Al alloys; cleaning methods and other treatments. Suitable paint finishes and methods of stripping paint films from these surfaces. (L26, Al)

213-L. "Why" as Applied to Cyanide Zinc Plating. Thomas J. Menzel. *Plating,* v. 40, Apr. 1953, p. 364-365, 377.

Reasons for dull, rough, thin, and blistered deposits. (L17, Zn)

214-L. Cleaning and Preparation of Metals for Electroplating. V. Oil Spreading Rates. Henry B. Linford and Edw. B. Saubestre. *Plating,* v. 40, Apr. 1953, p. 379-386.

Determines spreading rates of oils on steel surfaces under conditions wherein the atomizer test may be used industrially. Effect of

spreading on cleaning index values obtained with this test. (L12, ST)

215-L. Metalization of Plastics. Harold Narcus. *SPE Journal,* v. 9, Mar. 1953, p. 26-29.

Methods of applying and uses of metal coatings on plastics. Tables. 17 ref. (L general)

216-L. (German.) **Industrial Investigation of an Installation for Electrostatic Oiling of Steel Tubing Surfaces.** Ottomar Schaffer and Wilhelm Feldmann. *Stahl und Eisen,* v. 72, Dec. 18, 1952, p. 1662-1665.

New electrostatic-spraying process for applying oils and paints. Advantages. Tables and graphs. (L26, ST)

217-L. Bureau Is Evaluating Vinyl Paints. W. S. Humphrey, Jr., and F. M. Van Etten. *Bureau of Ships Journal,* v. 1, Apr. 1953, p. 39-43.

Tests, applications, and results on the vinyl ship-bottom paint system. Photographs and tables. (L26)

218-L. An Electron - Micrograph Study of Oxide Films on Electropolished Surfaces of Iron. E. J. Caule and M. Cohen. *Canadian Journal of Chemistry,* v. 31, Mar. 1953, p. 237-241.

Study of surface topography produced by electropolishing of Fe in a HCl-perchloric acid bath. Micrographs. 15 ref. (L13, Fe)

219-L. Coating Research Extends Life. P. M. Hess. *Electrical World,* v. 139, Apr. 6, 1953, p. 90-93.

Tests of 16 different coatings which prove merit of vinyl products and establish procedure for preparing and painting steel to prolong useful life. (L26, CN)

220-L. Coating Steel Strip Automatically Prior to Fabrication. *Finish,* v. 10, Apr. 1953, p. 32-33.

Special painting machines. Photographs. (L26, ST)

221-L. Automatic Finishing for Metal Furniture. R. J. Deisenroth. *Finish,* v. 10, Apr. 1953, p. 45, 48, 68.

New continuous finishing system which incorporates flow coating and electrostatic spraying. Photographs and diagrams. (L26, ST, Al)

222-L. Development of Thiokol Polymer Protective Coatings for Steel. Anthony P. Massa, Herman Colon, and W. Fred Schurig. *Industrial and Engineering Chemistry,* v. 45, Apr. 1953, p. 775-782.

Development of polysulfide protective coatings. Test data. 12 ref. (L26, ST)

223-L. Polishing and Barrel Finishing. L. Mable. *Metal Industry,* v. 82, Mar. 13, 1953, p. 206-207; Mar. 27, 1953, p. 244-246.

The problems which arise in organization of a polishing department and means for their solution. Layout of barrel finishing departments. Different types of barreling machines and type of work for which they are suited. Photographs. (L10)

224-L. Vapor Deposited Coatings for Titanium. *Metal Progress,* v. 63, Mar. 1953, p. 192, 194.

Condensed from "Research and Development of Methods of Vapor Deposited Coatings for Titanium and Titanium Alloys; Final Technical Report", Report no. 401/48/B-10, by Sam Tour & Co., Inc., for Watertown Arsenal. (L25, Ti)

225-L. Practical Aspects of Zinc and Cadmium Plating. Edwin F. Ottens. *Products Finishing,* v. 17, Apr. 1953, p. 24-26, 28, 30, 32, 34, 36, 38, 40, 42, 44.

Prewar preference for Cd, present position of Cd, Zn plating, operating conditions, removal of impurities, cleaning preparatory to plating, pickling, treatment after Zn plating, and black coatings on Zn. (L17, Cd, Zn)

226-L. Vacuum Impregnation of Castings Forms Base for High Quality Paint Finish. John Starr. *Products Finishing,* v. 17, Apr. 1953, p. 48-52, 54.

Castings found difficult to finish with paint, varnish, lacquer, or enamel by reason of pores in the metal, may be impregnated with Na_2SiO_3, vinyl lacquer, styrene, or phenolic resin by vacuum processing. Successfully used with Al and Cu. Photographs. (L26, E25, Al, Cu)

227-L. Ceramic Coatings Boost Alloy Steel Use. Fred D. Shaw. *Steel,* v. 132, Apr. 13, 1953, p. 110, 112.

Advantages of using the coatings. Coating procedure. (L27, ST)

228-L. Liquid Blanket Reduces Oxidation of Molten Zinc. A. A. Paterson. *Steel,* v. 132, Apr. 13, 1953, p. 136, 138.

Regenerative crystals added to galvanizing bath serve to maintain fluidity of blanket which in turn effects sharp reduction of dross formation. (L16, Zn)

229-L. Small Plating Plants. How To Save Nickel Solution. *Iron Age,* v. 171, Apr. 16, 1953, p. 117.

Method of dumping Ni storage tanks which saves plating solution and money. (L17, Ni)

230-L. Descaling Stainless Steel Tube. Use of the Sodium Hydride Process by Accles & Pollock, Ltd. N. L. Evans. *Iron & Steel,* v. 26, Apr. 1953, p. 134-136.

Plant and performance of the process. Photographs. (L12, SS)

231-L. Chromium Diffusion for Corrosion and Abrasion Resistance. Fred M. Burt. *Metal Finishing,* v. 51, Apr. 1953, p. 72-75, 84.

Thermo-chemical process which makes iron and steel resistant to heat, corrosion, and wear. (L15, Cr, ST)

232-L. Control of Phosphating Solutions. Ion Exchanger a New Method for Rapid Analysis. Gunnar Gabrielson. *Metal Finishing,* v. 51, Apr. 1953, p. 76-78.

Exchange method which is comparatively rapid and sufficiently accurate for determination of phosphates and accelerators in phosphating solutions. Graphs and tables. (L14)

233-L. Vertical Furnace for Enamelling. *Metallurgia,* v. 47, Mar. 1953, p. 145-146.

Describes a continuous and reversible tower-type furnace. Photographs and diagrams. (L27)

234-L. Finishing Control Methods. Frank Spicer. *Product Finishing,* v. 6, Mar. 1953, p. 53-55, 98.

Advantages and how controls can be handled for viscosity, mixing, material supply, and air control. (L general)

235-L. Revolutionary Nickel Plating Process May Permit Many New Applications. *Refrigerating Engineering,* v. 61, Apr. 1953, p. 402.

The Kanigen process which uses chemical means for plating. Advantages. (L17, Ni)

236-L. Electropolishing of Copper Powder Compacts. E. Bull Simonsen. *Research,* v. 6, Apr. 1953, p. 24S-25S.

Investigation to determine effect of electropolishing on porosity. Micrographs. (L13, H general, Cu)

237-L. Here's How To Graft Aluminum Skin to Steel. D. K. Hanink and A. L. Boegehold. *SAE Journal,* v. 61, Apr. 1953, p. 40-45; disc., p. 46.

Based on "Coating Steel by the Aldip Process", presented at SAE Annual Meeting, Detroit, Jan. 12. 1953. The process, its metallurgy. Al content in diffused alloy layer. case depth, and oxidation resistance. Graphs and micrographs. (L16, Al, CN)

238-L. A Suitable Arrangement for Bath Heaters in Pickling Tanks. W. Mazurzak. *Draht* (English Ed.), Mar. 1953, p. 38-39.

Briefly describes layout and mechanism. Diagrams and photographs. (L12)

239-L. Galvanic Descaling, Derusting, Deburring, and Polishing and a Method of Acid Galvanizing. Richard Beck. *Draht* (English Ed.), Mar. 1953, p. 42-43.

Newly patented "Dynamisator" process. Diagram. (L16, L12)

240-L. Preparation for Hot Galvanizing. W. Haarmann. *Draht* (English Ed.), Mar. 1953, p. 50-51.

Advantages and procedure for galvanizing iron and steel. Diagrams. (L16, CI, ST)

241-L. (French.) Pickling of Special Steels. G. Batta, L. Scheepers, L. Winandy, and G. Dallemagne. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 49-56.

Investigations with HNO_3-HCl-HF using $Fe_2(SO_4)_3$ in the pickling bath as an oxidizing agent. Tables. (L12, SS)

242-L. Problems of Utilizing Ceramics in Aircraft Power Plant Construction. Rodney A. Jones and Lester T. Fuszara. *American Ceramic Society Bulletin,* v. 32, Apr. 1953, p. 107-109.

Development and use for gas turbine buckets and nozzle vanes: rocket engine thrust cylinders; and thin protective coatings for various metal components. Photographs. (L27)

243-L. A Study of the Enameling of Sheet Nickel. J. H. Healy and A. I. Andrews. *American Ceramic Society Bulletin,* v. 32, Apr. 1953, p. 119.

Tremendous formation of bubbles and apparent lack of adherence of porcelain enamel to sheet Ni is attributed to CO_2 gases. Two methods of heat treatment for elimination of these defects. (L27, Ni)

244-L. Spray Application and Control of Porcelain Enamel. M. L. Pouilly. *Canadian Chemical Processing,* v. 37, Apr. 1953, p. 50, 52, 54.

For quality finishes consideration must be given to equipment used, spray technique employed, way the material is controlled, and how equipment is maintained. (L27)

245-L. The Electrolytic Polishing of Amphoteric Metals. E. J. Casey and R. E. Bergeron. *Canadian Journal of Chemistry,* v. 31, Apr. 1953, p. 422-438.

Experimental determinations of conditions necessary for electrolytic polishing of amphoteric metals in alkali hydroxide solutions. Effects of temperature, electrolyte concentration, current density, and time of current flow. Graphs, tables, and micrographs. 18 ref. (L13)

246-L. Silverplate. Modern Automatic Processing. *Canadian Metals,* v. 16, Apr. 1953, p. 44, 46.

How mechanized and automatic methods are used to prepare surface for plating. Photographs. (L17, Ag)

247-L. Ion Exchange Processes in the Plating and Allied Industries. Part I. An Assessment of Their Position in the Plating and Anodising Process. Part II. Ion Exchange in Recovery Processes. *Electroplating and Metal Finishing,* v. 6, Jan. 1953, p. 3-9; Apr. 1953, p. 121-130.

Part I: Effect on Zn plating of impurities in natural water; effects of suspended and precipitated matter; scummy films; impurities of Cl, Cu, Pb, carbonates, bicarbonates, nitrates, and organic matter; and demineralized water. Part II: Control of metal and trivalent contamination in Cr plating solutions and in chromic acid anodizing baths, recovery of chromic acid from rinse waters, and removal of Fe from phosphoric acid pickling baths. (L17, L19, Zn, Cr)

248-L. Chemical Oxidation of Aluminium for Decorative Purposes. *Electroplating and Metal Finishing,* v. 6, Apr. 1953, p. 133-135.

Different processes with emphasis on the M.B.V.-Type. Coloring or dyeing the coatings. (L14, Al)

249-L. The Crosley Refrigerator Finish. D. C. Williams and E. L. Faneuf. *Industrial Finishing,* v. 29, Apr. 1953, p. 22-24, 26, 28, 30, 33-34.

Problems and procedure for applying the coating. Photographs. (L27, CN)

250-L. Catalyst Spraying. W. Beacham. *Industrial Finishing,* v. 29, Apr. 1953, p. 36, 38, 40-41.

Use of a spray gun which mixes curing agent and paint as atomized particles. Photographs. (L26)

251-L. Airless Spray Painting of Metal Ironing Boards. E. A. Carpenter. *Industrial Finishing,* v. 29, Apr. 1953, p. 56-58, 60.

Procedure and its advantages. (L26, CN)

252-L. Metal Cleaning Process by Detrex Utilizes Ultrasonic Waves. *Industrial Heating,* v. 20, Apr. 1953, p. 737-740.

New method which utilizes a ceramic transducer element for directing sound energy. Advantages. Photographs. (L10)

253-L. Ultrasonic Waves Used for Industrial Cleaning. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 131-132.

Briefly describes equipment. Photographs. (L10)

254-L. Notes on the Peeling of Nickel Deposits. Edmund T. Richards. *Metal Finishing,* v. 51, Apr. 1953, p. 64-67; May 1953, p. 60-65.

Points out most important causes. Ways and means to avoid and counteract them. 53 ref. (L17, Ni)

255-L. Cleaning Precision Parts on a Jobbing Basis. Eugene F. Anderson. *Metal Treating,* v. 4, Mar.-Apr. 1953, p. 6-7, 30.

The wet blasting process and its advantages. Photographs. (L10)

256-L. Silver-Plated Aluminum Busbar. *Modern Metals,* v. 9, Apr. 1953, p. 46.

Use of a Zn-Cu-Ag plating treatment in order to utilize Al in the electric industry. (L17, T1, Al, Zn, Cu, Ag)

257-L. The Determination of Boric Acid in Nickel Plating Baths. Earl J. Serfass, Robert B. Freeman, and Edwin Pritchard. *Plating,* v. 40, Jan. 1953, p. 59-62.

Effect of presence of Ni, precipitation agents, effect of impurities, mineral acid present, and procedure for determining the latter. Tables and graphs. (To be continued.) (L17, S11, Ni)

258-L. Developments in Automatic Printing and Coating of Steel Sheets at the Works of Rheem Lysaght Ltd. *Sheet Metal Industries,* v. 30, Apr. 1953, p. 281-284, 296.

Equipment for decorating metal packings and boxes. Photographs. (L26, ST)

259-L. The Mechanical Surface Finishing of Metals. (Concluded.) G. T. Colegate. *Sheet Metal Industries,* v. 30, Jan. 1953, p. 5-17; Apr. 1953, p. 303-305, 307.

Various aspects of barrel finishing, and factors which influence the end result. Barreling of ferrous metals. Blast processes and other miscellaneous methods. (L10, Fe)

260-L. Automatic Spraying, Drying and Brushing Unit for Vitreous-Enamelled Parts. *Sheet Metal Industries,* v. 30, Apr. 1953, p. 311-312.

Equipment and layout. Photographs. (L27)

261-L. Fully Mechanized Rotary Pickling Installation for Hot-Rolled Strip. E. W. Mulcahy. *Sheet Metal Industries,* v. 30, Apr. 1953, p. 330-331, 334.

Plant layout. Diagrams. (L12, CN)

262-L. Hard Chromium Plating Salvages Critical Items; Increases Wearing Power. *Western Metals,* v. 11, Apr. 1953, p. 53-54.

How the plating process rebuilds worn parts and provides protective coverings. Photographs. (L17, Cr)

263-L. "One-Stop" Enameling Shop Has Flexible Operation for Variety of Finishes. *Western Metals,* v. 11, Apr. 1953, p. 68-70.

Various procedures adopted by an enameling firm to provide high-quality work with any type of finish on a variety of shapes in any quantity. Photographs. (L27)

264-L. Modern Pickling Plant for the Wire and Bar Industry. Norman Swindin. *Wire Industry,* v. 20, Apr. 1953, p. 409, 411-413.

Various problems encountered in heating the pickling bath, fume extraction, and recovery of spent pickle. Suggests the best methods to adopt for overcoming these difficulties. Diagrams. (L12)

265-L. Bindarine as an Addition Agent in the Deposition of Copper. W. Gauvin and C. A. Winkler. *Canadian Journal of Technology,* v. 31, Apr.-May 1953, p. 114-119.

Summary of experimental information about the action of bindarine as an addition agent in the electrodeposition of Cu for comparison with the results previously obtained with gelatin. Graphs. 16 ref. (L17, Cu)

266-L. Phosphate Coatings Benefit Metal Finishing and Working. Allen G. Gray. *Metal Progress,* v. 63, Apr. 1953, p. 106-109.

Use of the coatings as paint base, corrosion prevention, and metal-working aid. Photographs. (L14, F1)

267-L. Are You Hard Facing Effectively? Howard S. Avery. *Mining Congress Journal,* v. 39, Apr. 1953, p. 106-111.

Outstanding advantages of hard facing and its application. Tables, diagrams, and photographs. (L24)

268-L. Finishes for Soft Soldering Electroplated Metal Coatings. E. E. Halls. *Product Finishing,* v. 6, Apr. 1953, p. 42-50, 106.

Advantages of Sn, Cd, and Ag plated coatings as well as process details for their use. Tables. (L17, K7, Sn, Cd, Ag)

269-L. Pre-Treating Aluminium Components. *Product Finishing,* v. 6, Apr. 1953, p. 51-52, 108.

Advantages of the process and plant layout. Photographs. (L14, Al)

270-L. Some Causes of Paint Failure. E. Johnson. *Product Finishing,* v. 6, Apr. 1953, p. 53-57, 106.

Reviews faults which can be attributed to incorrect techniques, improper use of equipment, or poor pretreatment of the surface to be painted. (L26)

271-L. (German.) **Electrolytic Polishing and Its Applications.** A. Schwarz. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 95, no. 9, Mar. 1953, p. 273.

Electrolytic and mechanical polishing are contrasted. Materials, baths, and industrial applications. (L13)

272-L. Brake Disks Deburred on Special Fixtures in Rotating Barrels. W. J. Hobday. *Automotive Industries,* v. 108, May 1, 1953, p. 53, 102.

Equipment for deburring SAE 1035 disks. Photographs. (L10, CN)

273-L. Tin Plate Now Being Manufactured by Completely Modern West Coast Mill. T. G. Simison and M. C. King. *Blast Furnace and Steel Plant,* v. 41, May 1953, p. 489-496, 502.

Continuous pickler, cold reduction, electrolytic cleaning, annealing department, temper rolling, coil preparation, flying shear line, hot dip tinning, and electrolytic tinning. Photographs. (L16, L17, J23, F23, CN, Sn)

274-L. Properties of Electrodeposited Nickel. *Canadian Metals,* v. 16, May 1953, p. 38, 40, 42.

Study of conditions during the electrodeposition of Ni shows that properties such as hardness, tensile strength, and others can be varied over a wide range by proper choice of plating bath. (L17, Q27, Q29, Ni)

275-L. A Method for Determining the Resistance of Insulating Joints and Pipe Line Coatings. H. F. Koester. *Corrosion* (Technical Section), v. 9, May 1953, p. 159-162.

Method which combines field resistance measurements and algebraic computations of true resistances. Detailed instructions are given for placement of test points and the formulas are explained. Special method for use with poorly coated or uncoated pipe lines. Diagrams. (L26)

276-L. Report on Surface Preparation of Steels for Organic and Other Protective Coatings. *Corrosion* (Technical Section), v. 9, May 1953, p. 173-185.

Mechanical and chemical surface preparation processes, conditioners and pretreatments for organic and

other coatings that have been used commercially. Surface preparation practices for galvanized surfaces; maintenance and repair conditioning of surfaces and coatings; and assembly of dissimilar metals. (L general, ST)

277-L. Electrodeposition of Copper From the Monoethanolamine Bath. T. L. Rama Char and N. B. Shivaraman. *Electrochemical Society, Journal,* v. 100, May 1953, p. 227-231.

Detailed description. Tables. 17 ref. (L17, Cu)

278-L. Electrodeposition of Cadmium From Fluoborate Solutions. T. R. Anantharaman and J. Balachandra. *Electrochemical Society, Journal,* v. 100, May 1953, p. 232-236.

Effects of variables on plating characteristics of the Cd fluoborate solutions were studied to deduce optimum conditions for electroplating Cd. Tables. (L17, Cd)

279-L. Electrogalvanizing From Fluoborate Solutions. T. R. Anantharaman and J. Balachandra. *Electrochemical Society, Journal,* v. 100, May 1953, p. 237-239.

Investigations made to determine optimum conditions for electroplating Zn from its fluoborate solution. Compares best fluoborate bath with baths presently used for electrogalvanizing. Tables. (L17, Zn)

280-L. Studies in the Discontinuities of Electrodeposited Metallic Coatings. Parts II and III. S. C. Shome and U. R. Evans. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 45-74; disc., p. 75-89.

Part II: Two methods were developed for measuring total uncovered area of a plated specimen. Part III: Theoretical principles underlying porosity tests for metallic coatings on steel. Graphs, diagrams. 17 ref. (L17, ST)

281-L. The Development of Tin-Zinc Alloy Plating in the U. S. A. Frederick A. Lowenheim and Robert M. MacIntosh. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 115-128.

Presents operating data for the all-potassium bath and explains a discrepancy between English and American results using the Na bath. Tables and graphs. 12 ref. (L17, Zn, Sn)

282-L. The Electrodeposition of Bright Tin-Nickel Alloy Plate. N. Parkinson. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 129-151.

Process which deposits a single-phase alloy of Sn and Ni, corresponding to the formula NiSn. Graphs and micrographs. (L17, Ni, Sn)

283-L. The Crystal Structure of Metallic Electrodeposits. G. I. Finch and D. N. Layton. *Electrodepositors' Technical Society, Journal,* v. 27, 1950-51, p. 215-226; disc., p. 227-232.

Bath conditions, crystal growth, and mechanical and physical properties of electrodeposits. Micrographs. (L17, M26, P general, Q general)

284-L. Alkali-Fluoro-Silicate Glasses as Vitreous Enamels for Aluminum. E. C. L. Rao. *Finish,* v. 10, May 1953, p. 31-33, 72-73.

Development of an enamel using the AlF_3-NaF-CaF_2 phase diagram modified by the substitution of Li for Na. Tables. (L27, Al)

285-L. Electroless Nickel Plating. Where It Stands Today. John B. Campbell. *Materials and Methods,* v. 37, May 1953, p. 96-100.

Summarizes the information currently available on "electroless" Ni plating and indicates present and probable future status of the process. (L17, Ni)

286-L. Chromizing Improves Surface Properties of Steels. Richard P. Seelig. *Materials and Methods,* v. 37, May 1953, p. 106-109.

Process which uses a reaction between a gaseous Cr compound and Fe as a means of exchanging iron atoms for Cr at the surface of the steel. Process applicable to low-carbon steels, alloy steel, high-Cr, and other stainless steels. (L15, Cr, CN, AY, SS)

287-L. Immersion "Brass" Coatings on Steel. Hartmut W. Richter. *Metal Finishing,* v. 51, May 1953, p. 66-67, 76.

Immersion plating of steel with Sn and Cu from a $SnSO_4$-$CuSO_4$ bath. (L17, ST, Sn, Cu)

288-L. Surface Coating Protection by the Evaporation-Condensation of the Rarer Metals. *Metal Finishing,* v. 51, May 1953, p. 77. Translated and condensed from *Metalloberflaeche,* v. 6. no. 7, July 1952, p. A109-A110.

Experiments showed that volatile halogen compounds of U, Th, V, Ti, Zr, Hf, Mo, W, and Re are suitable for metallizing in presence of protective gases or in high vacuum. (L25)

289-L. Black Oxide Coatings on Steel. *Metal Finishing,* v. 51, May 1953, p. 77-78. Translated and condensed from *Werkstoffe und Korrosion,* v. 3, no. 7, p. 286.

Coloring agent S2 Schering Black rapidly colors iron and steel parts a deep black. (L14, Fe, St)

290-L. Simultaneous Pickling and Degreasing With the Electro-Alkaline Bath. T. Skutta. *Metal Finishing,* v. 51, May 1953, p. 78-79. Translated and condensed from *Beiztechnik,* v. 1, no. 4, p. 53-54.

Describes Derostan process which combines pickling and degreasing in one process. (L12)

291-L. Statistical Control of Modern Continuous Pickling Bath Lines. W. Fackert. *Metal Finishing,* v. 51, May 1953, p. 79. Translated and condensed.

Previously abstracted from *Stahl und Eisen.* See item 958-L, 1952. (L12, S12, ST)

292-L. How to Combat Corrosion of Metals. R. W. Strauss. *Plant,* v. 7, May 1953, p. 38-46.

Controlling corrosion through use of protective coatings. Surface preparation, material selection, and primer. Photographs. (L general)

293-L. Tin-Nickel Alloy Plate. *Products Finishing,* v. 17, May 1953, p. 42, 44, 46, 48.

Process which consists of depositing Sn and Ni alloy to yield a plate which is both tarnish-resistant and decorative. (L17, Sn, Ni)

294-L. It Will Pay You to Examine Surface Treatment Methods. Allen G. Gray. *Steel,* v. 132, May 18, 1953, p. 92-94, 96.

Developments in surface treatment make it possible to improve adhesion and durability of plated coatings. Chromate treatments for Al, Zn, Cd, Mg, Cu, and brass. (L14, Al, Zn, Cd, Mg, Cu)

295-L. (German.) **Fundamentals of Electrodeposition of Gold in Cyanide Solutions and Its Use in Practice.** B. Wullhorst. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A49-A58.

Fundamentals are discussed particularly for Au plating by diffusion; for electrodeposition of Au alloy coatings, and for processes of separating electrodeposited Au alloys. Photographs, graphs. 9 ref. (L17, Au)

296-L. (German.) **Gold Plating in the Light of Recent Technical and Patent Literature.** Richard Springer. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A61-A64; no. 5, May 1953, p. A76-A79.

A review of patent and other literature on Au plating of different metals. Tables. 109 ref. (L17, Au)

297-L. (German.) **Silver Burnishing Baths.** Gerhard Heilmann. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B53-B58.

Two processes are cited. Difficulties in determining the process termination because of variables such as current density or hardness are discussed. 35 ref. (L17, Ag)

298-L. (German.) **Electroplating With Gold.** Otto Loebich. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B58-B61.

Describes a fine gold plating bath, a Au-Ag plating bath, and a Au-Cu-(Ag) plating bath for corrosion resistant Au films, each having unique characteristics. Use of proprietary materials is recommended. Tables. (L17, Au)

299-L. (German.) **Electroplating Practices With Platinum Metals.** H. L. Grube. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B61-B64.

Industrial Pt, Pd, and Rh plating baths. Pt plating is seldom done, Pd plating is used on small parts, Rh plating is used on jewelry and on electrical contacts. 2 ref. (L17, Pt, Pd, Rh)

300-L. (German.) **Ag Anodes.** E. R. Thews. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B64-B65.

Advantages of high-purity Ag anodes. (L17, Ag)

301-L. (German.) **Protective Lacquer for Silverware.** K. Stark. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. B65.

Performance of synthetic resin modified nitrocellulose lacquer with good adhesion. (L26, Ag)

302-L. Increasing the Life of Pulveriser Hammers, Excellent Results With Cobalide. *Australasian Engineer,* Mar. 1953, p. 72a-72b.

Results of experiments for hard facing hammers. (L24, Cr, Fe, Mn)

303-L. Cleaning and Painting Heavy Steel Products. Walter Rudolph. *Industrial Finishing,* v. 29, May 1953, p. 37-38, 40, 42.

Equipment used to support parts to be cleaned and/or painted. Photographs. (L12, L26)

304-L. Printing on Finished Metal by Screen Process. Tony Capua. *Industrial Finishing,* v. 29, May 1953, p. 48-50.

Briefly describes the process. (L26)

305-L. Chemical Plating. *Metal Industry,* v. 82, Apr. 24, 1953, p. 329.

"Kanigen" plating process is said to be capable of plating any article uniformly, regardless of size or shape. Process can be used for production-line plating of steel, Cu, brass, bronze, stainless steel, and Al. (L17, Cu, Al, SS)

306-L. Electroplating on Magnesium. H. K. DeLong. *Metal Industry,* v. 82, Apr. 24, 1953, p. 327-329.

Process which offers a practical means of producing both adherent

and protective electrodeposits on Mg. (L17, Mg)

307-L. Metallising of Glass, Ceramic and Plastic Surfaces. R. J. Heritage and J. R. Balmer. *Metallurgia,* v. 47, Apr. 1953, p. 171-174.

Metallizing techniques such as reduction from aqueous solutions, reduction by heat, and evaporation of metals in a vacuum. Comparison of the methods and a survey of their uses. 19 ref. (L23)

308-L. Japanese Electroplating Practice. Ezra A. Blount. *Plating,* v. 40, May 1953, p. 477-482, 487, 497.

State of development of electroplating practice. Processes not used in the U. S., such as Cr plating at room temperature, Daniell cell Cu plating, and oxalic acid anodizing. Photographs. 8 ref. (L17, Cr, Cu, Zn, Ag)

309-L. Tips on Surface Refinishing of Stainless Steel Work. E. M. Rains. *Sheet Metal Worker,* v. 44, May 1953, p. 66-67.

Pictures illustrate finishing and polishing techniques. (L10, L12, SS)

310-L. Silver Dips. Howard Brenner. *Soap and Sanitary Chemicals,* v. 29, May 1953, p. 161, 163, 165, 167, 183.

Principles and chemistry of the tarnish removing solutions. 51 ref. (L12, Ag)

311-L. Protection of Aluminium Front Surface Mirrors by Anodic Oxidation. L. Holland and N. Sutherland. *Vacuum,* v. 2, Apr. 1952, p. 155-159.

Experiments to determine oxide thickness at which response of mirrors was most achromatic. Graphs. (L19, Al)

312-L. (French.) **Improvement of an Electrolytic Polishing Apparatus.** P. Rocquet and G. Jegaden. *Métaux Corrosion—Industries,* v. 28, no. 239, Jan. 1953, p. 28-32.

Equipment which may permit metallographic specimens to be made. Modification has been used successfully by the I.R.S.I.D. for over a year. Micrographs, diagrams. 3 ref. (L13)

313-L. (French.) **Note on Electrolytic Polishing of Aluminum and its Alloys.** Andre Pillon. *Métaux Corrosion—Industries,* v. 28, no. 239, Jan. 1953, p. 33-35.

Use of perchloric and acetic acids. Composition, characteristics, results, and hazards of the bath. Graph, micrographs. 2 ref. (L13, Al)

314-L. (French.) **Measure for Effectiveness of Protective Coatings.** A. Walter. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 43-46.

Portable apparatus for determining dielectric strength of protective coatings. Testing in general. Photographs, diagrams. (L general, P15)

315-L. (German.) **Modern Metal-Spraying Guns. Pt. II.** H. Reininger. *Metalloberfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A40-A47.

Commercially available spraying machines for use with wire, power, or premelted metal. (L23)

316-L. (German.) **Electrolytic Pickling of Iron and Steel in Alkaline Solutions and Melts.** Richard Springer. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A9-A12.

Various types of pickling, and advantages and prospects of an electrolytic process. (L13, CI, ST)

317-L. (German.) **Chemical Sharpening of Files.** A. Pollack. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A13-A14.

Process which involves alkali cleansing, acid pickling, neutralizing, rubbing, acid etching, oil removal, and re-etching. (L12, CN)

318-L. (German.) **Photographic Reproduction of Anodically Oxidized Aluminium.** W. I. Kirillov and A. S. Kheynman. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A14-A15.

The Bekunov-Shostko process for determining the density and porosity of oxide films. (L19, R2, Al)

319-L. (German.) **When Does a Polishing Wheel Crack?** Carl Krug. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B3-B4.

Test data. (L10)

320-L. (German.) **Chemical Polishing.** R. Erdmann. *Metalloberfläche,* v. 7, ser. B, no. 1, Jan. 1953, p. B4-B6.

Suitable materials and conditions for polishing. Necessity of pretesting. (L12)

321-L. (German.) **Conversion of Rust.** A. Pollack. *Metalloberfläche,* v. 7, ser. B, no. 3, Mar. 1953, p. B37-B38.

Chemical process for converting the rust on Fe to a protective coating. (L14, Fe)

322-L. (German.) **"Roto-Finish", the New Mechanical Process for Trimming, Grinding, and Polishing Mass-Production Articles. Part I.** H. Nann and H. A. O. Fitzler. *Metalloberfläche,* v. 7, ser. B, no. 3, Mar. 1953, p. B41-B47.

The procedure, substances for mineral grinding and polishing, and "Roto-Finish" compounds. (L10)

323-L. Protective Coatings for Buried Pipelines. K. A. Spencer and H. B. Footner. *Chemistry & Industry,* May 9, 1953, p. 448-455.

Properties required of a coating, selection of materials, and procedures for enameling. Photographs. (L26, CN)

324-L. Comparison of Plastic Tape and Hot Enamels for Protective Coatings of Pipe. N. P. Peifer. *Gas Age,* v. 111, May 21, 1953, p. 41-43, 98, 100.

Cost facts and figures for protection of typical lines by anodes, mill-coated pipe, plastic tape, and over-the-ditch coated pipe. Test procedures used. (L general, CN)

325-L. Electrolytic Polishing of Lead in a Sodium Acetate-Acetic Acid Bath. Elizabeth Jones and H. R. Thirsk. *Nature,* v. 171, May 9, 1953, p. 843.

Polishing specimens for experimental work. (L13, Pb)

326-L. Metal Cleaning Equipment and Methods. John E. Hyler. *Organic Finishing,* v. 14, May 1953, p. 7-10.

Solution-type cleaning, vapor-type degreasers, alkali cleaners, advantages of corrosion resistant coatings, cleaners for Al, oxide removal, and storage of cleaners. Photographs. (L general, Al)

327-L. Finishing Vauxhall Automobiles. W. F. Coxon. *Organic Finishing,* v. 14, May 1953, p. 14-18.

Features of the finishing line. Photographs. (L general, CN)

328-L. The Effect of Flash-Drying Procoat Enamel on Internal Can Temperatures. George W. Grupp. *Organic Finishing,* v. 14, May 1953, p. 19-22.

Investigation to determine fastest method of drying procoat of metal containers without damaging their food contents. Tables. (L26)

329-L. Galvanizing Can be Automatic. Lyle Baker. *Steel,* v. 132, May 25, 1953, p. 170-171.

Use of a chain conveyor to handle all steps in the galvanizing operation. Photographs. (L16)

330-L. Metallizing Gives New Life to Old Parts. *Steel Horizons,* v. 15, no. 2, 1953, p. 24-25.

How the process, using stainless steel, adds life to worn parts. Photographs. (L23, SS)

331-L. Advantages of Hard Chrome Plating in the Corrugator Field. M. P. Boggio. *Tappi,* v. 36, May 1953, p. 170A-171A.

Economy and advantage of plating rolls rather than completely replacing them. (L17, Cr)

332-L. Repainting Steel Water Tanks. J. O. Jackson. *Water & Sewage Works,* v. 100, May 1953, p. R70-R71, R74-R75.

Best-known methods of surface preparation. Suggests several paint systems which have been found to be most dependable and effective in general use. (L26, ST)

333-L. Galvanizing Plant Features Fume, Gas Heating Controls. *Western Metals,* v. 11, May 1953, p. 66-67.

New layout and equipment used in expansion of a Western plant. Photographs. (L16)

334-L. (German.) **Research on Plated Platinum Potentials in the Case of Cathodic Charging With Special Regard for Reversible Hydrogen Electrodes.** F. Tödt and W. Meyer. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 29-33.

Experimental data. Tables, graphs. (L21, Pt)

335-L. (German.) **Coating-Thickness Measurements With β-Rays and Counting Tubes.** R. Berthold. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 95, no. 7, Mar. 1953, p. 207-210.

Reverse radiation was used to measure thicknesses of Cr on Al, Au and Ag on brass, Cu on C, and rubber on Fe. Graphs. 6 ref. (L14, Cr, Al, Au, Ag, Cu, Fe)

336-L. (German.) **Outside Protection of Earth-Laid Cable and Leads by Insulative Protecting Coatings.** Fritz Glander and Wilhelm Glander. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 97-101.

Measures for cutting down damage by stray current. Photographs, graphs. 5 ref. (L26, P15)

337-L. (Russian.) **RP-50 Torches for Manual Surface Dressing.** *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 31-32.

Advantages of the new torch as compared with RVP-49. (L24)

338-L. (Book.) **Electrodepositors' Technical Society, Journal, (Annual Volume), v. 27, 1950-51.** 337 p. Institute of Metal Finishing, 32, Great Ormond St., London, W. C. 1, England.

Contains 17 papers, five of which are abstracted separately. (L17)

339-L. Electroplating on Beryllium. John G. Beach and Charles L. Faust. *Electrochemical Society, Journal,* v. 100, June 1953, p. 276-279.

Electrochemical and chemical activation for direct plating, and an intermediate replacement of Zn film. Diagram. (L17, Be, Zn)

340-L. Electroplating on Zirconium. W. C. Schickner, J. G. Beach, and C. L. Faust. *Electrochemical Society, Journal,* v. 100, June 1953, p. 289-291.
Methods for producing adherent electroplates on Zr. Tables, photographs. (L17, Zr)

341-L. pH. Its Meaning, Significance and Control in Plating Baths. Frank Spicer. *Electroplating and Metal Finishing,* v. 6, May 1953, p. 160-166.
Hydrogen ion concentration, buffer action, determination, measurement, and meters. Photographs, diagrams. (L17)

342-L. A Survey of Metal Spraying as Operated in Australia. Donald E. Harris. *Electroplating and Metal Finishing,* v. 6; *Metal Spraying,* v. 3, May 1953, p. 189-192.
Protective coatings applications, and metal spraying of bridge structures. (L23, CN)

343-L. Handling Controls Provide Precision Timing Through a Hot, Delicate Process. *Flow,* v. 8, June 1953, p. 78-79, 138.
Techniques in a porcelain enamel plant. Photographs. (L27)

344-L. Evolution of Vitreous-Enamel Formulae. A. W. Murdoch. *Foundry Trade Journal,* v. 94, Apr. 2, 1953, p. 389-392; May 7, 1953, p. 531-535; disc., p. 535-536.
Dry and wet-process enamels for cast iron, and wet-process enamels for sheet steel. Tables. (L27, CI, CN)

345-L. The Mechanization of Electroplating Processes. H. Silman. *Institute of Metal Finishing, Bulletin,* v. 3, Spring 1953, p. 49-62.
Basic lines on which trends in plating plant mechanization will develop. (L17)

346-L. Economical Coatings by Vacuum Metallizing. Mark Shepard. *Materials & Methods,* v. 37, June 1953, p. 97-99.
How high-volume production at low cost is leading to increased application. Table, photographs. (L25, Ag, Au, Cu)

347-L. How to Clean Stubborn Deposits From Stainless Steel. *Materials & Methods,* v. 37, June 1953, p. 252, 254.
Tips on removing a variety of stains and discolorations in stainless parts fabrication. Photographs. (L10, L12, SS)

348-L. My Experience With Analytical Control of Electroplating Solutions. George B. Hogaboom. *Metal Finishing,* v. 51, June 1953, p. 93-96, 102.
Brief history of the development of electroplating solutions and procedures. (L17)

349-L. Principles of Inside Polishing and Buffing. Edwin F. Doyle. *Metal Finishing,* v. 51, June 1953, p. 97-98, 102.
Use of muslin buffs for inside polishing. Diagrams, photographs. (L10)

350-L. Mechanism of Electropolishing. P. R. Rowland. *Nature,* v. 171, May 23, 1953, p. 931.
Certain metals may be anodically polished using pure molten KCl and NaCl. 3 ref. (L13, Au, Pt, Pd, Cu)

351-L. Metallizing in the Paper Mills. *Paper Trade Journal,* v. 136, May 29, 1953, p. 19-20.
Process, equipment, and applications. (L23)

352-L. A Practical Plating Cycle Without Nickel for Zinc Die Castings. William Bluestone. *Precision Metal Molding,* v. 10, Sept. 1952, p. 45-46.
Use of Zn as a substitute for brass. Shortages also demand changes in plating materials. (L17, Cu, Zn)

353-L. Clear Protective Coatings Over Chromium Plate Systems. George Lim Poy. *Precision Metal Molding,* v. 10, Nov. 1952, p. 38-42.
Water-clear protective coatings to increase outdoor durability of the copper-flash chromium system. (L17, L26, Cu)

354-L. Polishing and Buffing Zinc Die Castings. A Preliminary to Electroplating. *Precision Metal Molding,* v. 11, Feb. 1953, p. 55-57.
Some steps in polishing and buffing die castings. (L10, Zn)

355-L. How to Select Compounds for Barrel Finishing Metal Parts. Kurt G. O. Pinke. *Precision Metal Molding,* v. 11, Apr. 1953, p. 94-95, 97-101, 103, 105, 118-122, 125-126.
Deburring, burnishing, degreasing, scale and rust removal, and abrasive compounds. (L10)

356-L. Pointers on Plating Chromium Over Aluminum Die Castings. Clarence Forestek. *Precision Metal Molding,* v. 11, May 1953, p. 51-52, 54.
Surface cleaning and plating technique. (L10, L17, Al, Cr)

357-L. What Steel for Enamelers? M. B. Gibbs and F. R. Porter. *Steel,* v. 132, June 1, 1953, p. 108-109, 131, 135.
Merits of various low-C mild steels, enameling iron, and special irons and steels. Photographs. (L27, CN, AY)

358-L. Tooling Applications of Hard Facing Alloys. *Tool Engineer,* v. 30, June 1953, p. 65-69.
Abstracted from American Society

of Tool Engineers paper 21T21-1, "Tooling Applications of Hard Facing Alloys," by L. V. LaRow. Properties of hard facing alloys, "Sprayweld" process, and applications. Photographs. (L24)

359-L. Elements of Electroplating. Robert T. Kimmel. *Tool Engineer,* v. 30, June 1953, p. 75-84.

Surface control, equipment, plating racks, tanks, automatic plating machines, plant layout, and electroplating process. Diagrams, photographs. (L17)

360-L. Carbide Plating. *Automobile Engineer,* v. 43, May 1953, p. 186.

New process for plating metallic surfaces with WC to provide greater wear resistance.
(L general, Mg, Ti, Al, Cu, ST, CI)

361-L. Metal Finishing for Aircraft Engines. *Canadian Metals,* v. 16, May 20, 1953, p. 48-50.

Facilities for surface treatment of metals at a gas-turbine plant. Photographs. (L general, Al)

362-L. Evaluation of Heat-Finishing Equipment. Frank Charity. *Consulting Engineer,* v. 2, Apr. 1953, p. 66-69.

Compares uses, advantages, and disadvantages of the flame-spray, heat-spray, and steam-spray units. Diagrams. (L23)

363-L. Kinetics of Galvanizing. D. J. Blickwede. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 807-808.

Investigation on the rates of growth of the individual Fe-Zn layers over the temperature range 840 to 930° F. (L16, Zn, Fe)

364-L. Organic Protective Coatings for Metal Cans. S. L. Flugge. *Paint and Varnish Production,* v. 43, June 1953, p. 23-28, 79.

Applications of the linings and advantages of using organic compounds to coat steel plate. (L26, ST)

365-L. Influence of Operating Variables on Composition of Electroplated Lead-Tin Alloys. A. H. DuRose and D. M. Hutchison. *Plating,* v. 40, May 1953, p. 470-476, 497; June 1953, p. 630-632.

Investigation of current density, lead-tin ratio, total metal content, and addition agent content variables. Electrolytic method for determination of alloy composition was tested. Method is offered as an aid in solution control. Graphs, tables. (L17, S11, Pb, Sn)

366-L. Cleaning and Preparation of Metals for Electroplating. VI. Sensitivity of Degreasing Evaluation Tests. Henry B. Linford and Edw. B. Saubestre. *Plating,* v. 40, May 1953, p. 489-496; June 1953, p. 633-634, 639-645.

Compares sensitivities of various degreasing evaluation tests when oil residues are present as uniform films. Tables. (L17)

367-L. Some Experiences in Plating on Nickel Silver. George Schore. *Plating,* v. 40, June 1953, p. 628-629.

A series of practical and technical considerations which were followed in solving difficulties that cropped up with an especially troublesome lot of basis metal.
(L general, Ni, Ag)

368-L. Designing Aluminium Components for Finishing. A. W. Brace. *Product Finishing,* v. 6, May 1953, p. 49-54.

Factors that should be considered when an Al component is being designed and finished. Various finishes available for Al and its alloys. Photographs. (L general, Al)

369-L. Recent Developments in Paint Formulations. Machine Tool Finishes. *Product Finishing,* v. 6, May 1953, p. 55-56.

Use of cellulose lacquers as a new type of machine tool finish. (L26)

370-L. Finishes for Soft Soldering. Electroplating Aluminium and its Alloys. E. E. Halls. *Product Finishing,* v. 6, May 1953, p. 57-61, 112.

Types of finishes and pretreating methods. (L17, K7, Al)

371-L. Non-Ferrous Metals Research. *Product Finishing,* v. 6, May 1953, p. 62-63.

Research on improving the quality of electroplating so that thinner protective Ni coatings may be produced. (L17, Ni)

372-L. Uses of Sprayed Metal Coatings. *Product Finishing,* v. 6, May 1953, p. 68-76.

Report on some of the purposes for which coatings have been used, both with and without the addition of paint. Discusses the main benefits of corrosion and high-temperature oxidation resistance that may be obtained with them. Photographs. (L23, L26, R general, Al, Zn)

373-L. (English.) **The Kinetics of Formation and Structure of Anodic Oxide Films on Tantalum.** D. A. Vermilyea. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 282-294.

Rate of formation was studied using aqueous electrolytes. Thicknesses of films were measured by comparing the interference colors with a calibrated step gage. Graphs, tables, micrographs. (L19, S14, Ta)

374-L. (German.) **Nickel Saving Electrolytic Tin Coatings.** H. Kalpers. *Umschau in Wissenschaft und Technik,* v. 53, no. 6, Mar. 1953, p. 174-175.
Sn-Cu, Sn-Zn, and Sn-Ni coatings. (L17, Sn)

375-L. (German.) **Bright Pickling of Steel With "Trinorm".** Heinz Anders. *Werkstoffe und Korrosion,* v. 4, no. 4, Apr. 1953, p. 122-123.
Process that produces bright surfaces and is especially suited for steels with C content up to 0.9%. (L12, CN)

376-L. Electroless Plating Produces Hard Nickel Coating. E. Lamar Gostin. *Iron Age,* v. 171, June 11, 1953, p. 115-119.
Advantages of the purely chemical process. Photographs. (L14, Ni)

377-L. New Resin Linings Give Better Container Protection. David E. Hartman. *Iron Age,* v. 171, June 11, 1953, p. 129-132.
Various linings and points to consider when selecting. Photographs. (L26)

378-L. Fighting Corrosion at a Gulf Coast Terminus by Metalizing Parts With Zinc. F. Lawrence Resen. *Oil and Gas Journal,* v. 52, June 22, 1953, p. 273-274.
Process of metalizing parts with Zn. Photographs. (L23, Zn)

379-L. Portable Welder for Oilfield Work. Max Frederick, Jr. *Petroleum Engineer,* v. 25, June 1953, p. B55, B57-B58.
Mobile equipment which can be used in hard facing worn drill pipes, subs, and drill collars. Photographs. (L24)

380-L. Finishing Army Ordnance Shells. Frank L. Bonem. *Products Finishing,* v. 17, June 1953, p. 72-78.
Finishing operations for the 105-mm., M-32 cartridge case. Prepaint treatment, painting, solution maintenance, and inspection. Photographs. (L general)

381-L. New Methods Pay Off for High Temperature Ceramic Coating. *Steel,* v. 132, sec. 1, June 22, 1953, p. 88-90.
Facilities which were designed and constructed for processing high-temperature ceramic coatings. Coating offers solution for metals that must be protected from heat. Photographs. (L27)

382-L. Carbide Flame-Plating Presents New Possibilities. W. L. Donnelly. *Steel Processing,* v. 39, June 1953, p. 279-282.
Applications of the process which deposits powdered metals in form of a thin coating on metal parts. WC, Al, Mg, Cu, Ni, and stainless steel were successfully deposited. Photographs.
(L24, H general, W, Al, Mg, Cu, Ni, C-n, SS)

383-L. Chlorinated Rubber Finishes in Water and Sewage Works. Fred K. Shankweiler. *Water & Sewage Works,* v. 100, June 1953, p. 230-233.
Characteristics of chlorinated rubber-base paints for preventing corrosion. Successful applications in water and sewage works. (L26)

384-L. (English.) **Hydrogen Embrittlement of Steel During Electroplating. II. Zinc Electroplating.** Uno Trägardh. *Iva,* v. 24, no. 2, 1953, p. 53-71.
Electrodeposition of Zn on spring steels. Emphasizes changes of embrittlement during storage and heat treatment. Photographs, graphs, tables. 8 ref. (L17, Zn)

385-L. (French.) **The Metallic Surface. Tinning at a High Temperature.** A. Gordet. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 213, 215.
Difficulties encountered during preparation of steel surfaces. 1 ref. (To be continued.) (L17, ST)

386-L. (French.) **Continuous Cleaning.** G. Rossi-Landi. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 215, 217.
Installations in France that are being designed for the cleaning of tubes, threads, parts, etc. Compares the present continuous cleaning with that used before the war. (L10, L12)

387-L. (German.) **Present Status of Electrolytic and Chemical Burnishing (Polishing).** Heinz W. Dettner. *Metall,* v. 7, nos. 9-10, May 1953, p. 325-328.
Economy, applicability, properties of polished surfaces, bath recipes, and special electrolytes. Photographs. 1 ref. (L10, L13, Al)

388-L. (German.) **Phosphatizing of Nonferrous Metals.** A. Pollack. *Metall,* v. 7, nos. 9-10, May 1953, p. 335-336.
Parallels between phosphatizing Fe and Zn and their alloys. Photographs, tables. 8 ref. (L14, Fe, Zn)

389-L. (German.) **Zinc and Tin Coating of Steel With Antimony III Chloride Containing Hydrochloric Acid.** G. Schikorr. *Metall,* v. 7, nos. 9-10, May 1953, p. 337-340.
Failures that can occur and remedial possibilities. Graphs, tables. 6 ref. (L14, Zn, Sn, ST)

390-L. (German.) **Cross-Sectional View of Electroplating Technique in the Light of Standardization.** A. Hoch. *Metall,* v. 7, nos. 9-10, May 1953, p. 347-350.
Properties common to electrolyti-

cally produced, metallic layers. 5 ref. (L17)

391-L. (German.) **Economic Use of Anodic Oxidation and Polishing of Light-Metal Products.** V. D. Kammer. *Metall,* v. 7, nos. 9-10, May 1953, p. 361-362.
Industrial uses. Testing and exchange of experience. 16 ref. (L19, L13, Al)

392-L. (German.) **Properties of Anodically Produced Oxide Layers on Aluminum and Aluminum Alloys.** F. Solar. *Mitteilungen des chemischen Forschungsinstitutes der Wirtschaft Oesterreichs,* v. 7, no. 2, April 1953, p. 29-37.
Various layers and their properties. Graphs, tables. 10 ref. (L19, Al)

393-L. (German.) **Mechanical Descaling of Hot-Rolled Strip By Using Metallic Shot in a Centrifugal Process.** Martin Reimann and Siegfried Schwandt. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 630-639.
Fundamentals of process and tests. Advantages. Photographs, graphs, diagrams, tables. (L10, ST)

394-L. (German.) **Rust Protection Through Lead Cyanamide.** H. Zirngibl. *TVA,* v. 24, no. 2, 1953, p. 48-53.
Effectiveness of Pb cyanamide as a rust-protection pigment in highly leaded roof paints. Photographs. 3 ref. (L26, CN)

395-L. (German.) **Fluxes on Aluminum-Zinc Alloy Plating Baths.** H. Bablik, F. Götzl, and R. Kukaczka. *Werkstoffe und Korrosion,* v. 4, no. 4, Apr. 1953, p. 121-122.
Compositional changes of fluxes used in displacement plating of Zn on Al. 4 ref. (L17, Al, Zn)

396-L. (German.) **Protection Against Corrosion by Means of Sprayed-On Metal Coatings.** Hans Reininger. *Werkstoffe und Korrosion,* v. 4, no. 5, May 1953, p. 156-172.
Density and adhesiveness of the coating are indicated as the main factors which determine the success or failure of the process. Practical applications of the metal-spraying technique. Photomicrographs, diagrams, photographs, tables. 83 ref. (L23, Sn, Zn, Al)

397-L. (Hungarian.) **Anodic Oxidation Using an Alternating-Current Sulfuric-Acid Electrolyte, and the Application of the Process to the Protection of the Surface of Drawn Light-Metal Pieces in a Continuous Process.** Jozsef Antoni, Andras Domony, and Istvan Kurovszky. *Kohaszati Lapok (Aluminium),* v. 4, no. 12, Dec. 1952, p. 268-273.
Process and results obtained in plating wire. Tables, charts. (L19, Al)

398-L. (Book-German.) **Gespritzte Metallüberzüge (Sprayed Metal Coatings).** Hans Reininger. 246 p. 1952. Carl Hanser Verlag, Munich 27, Germany. 14.80 DM.
The metallurgical fundamentals of metal spraying are treated exhaustively. 151 figures, 25 tables. (L23)

399-L. Use of Ion Exchange Resins in Purification of Chromic Acid Solutions. Lloyd Gilbert, W. S. Morrison, and Floyd H. Kahler. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 31-52; disc. p. 52-54.
"Ion exchange unit" for treatment of chromic acid and actual results obtained. Graphs, photographs. (L26, Cr)

400-L. Engineering Aspects of Waste Prevention. D. Milne. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 55-67.
Control of industrial waste by exercise of waste prevention measures within the metal finishing shop. Diagrams. 10 ref. (L general, A8)

401-L. Some Experiences in Heavy Rhodium Plating. Harold J. Weisner. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 79-96; disc. p. 96-99.
Properties; cleaning and preparation; effect of metal and acids contents; control methods; effect of impurities: and purification of the bath. Graphs, tables. 7 ref. (L17, Rh)

402-L. An Explanation of Black Nickel Plating. Earl J. Serfass, Ralph F. Muraca, and Walter R. Meyer. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 101-109; disc. p. 109-111.
Theories of immersion blackening and black Ni electroplating (L17, Ni)

403-L. Materials of Construction for a Waste Water Treatment System. Fred G. Brune. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 113-117.
Selection of the materials used in a plating waste water treatment system. (L17, A8)

404-L. Materials of Construction for Plating Rooms. R. E. Harr. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 119-125.
Materials of construction used in floors; drains; piping systems for acid, alkali, and de-ionized water; exhaust systems; and tanks and tank linings. (L17, T5, Al, SS)

405-L. Plastics as Plating Room Engineering Materials. D. Gardner

Foulke. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 127-139; disc. p. 139-140.

Developments in plastics from the engineering aspect of plating operations. Photograph. (L17)

406-L. Vacuum Metallizing Today. J. Gordon Seiter. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 141-147; disc. p. 147-151.

Applications, materials, properties, developments, and advantages. (L25)

407-L. Current Distribution in Barrel Plating. A Statistical Study. William C. Geissman and Robert A. Carlson. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 153-161; disc. p. 161-165.

Investigation to determine the capabilities of the process of barrel Zn plating. Graphs. 6 ref. (L17, Zn)

408-L. Bright White Brass Plating. R. B. Saltonstall. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 167-174; disc. p. 174-179.

Present status of white brass plating. Graphs. (L17, Zn, Cu)

409-L. A Critical Review of Substitute Finishes. Myron Ceresa. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 181-197; disc. p. 197-199.

Finishes for present and possible future use. Tables. 16 ref. (L general)

410-L. Special Plating Plant Instrumentation and Apparatus. Frank K. Savage. *American Electroplaters' Society, Proceedings,* v. 39, 1952 p. 203-212; disc. p. 212-213.

A number of interesting special adaptations of more or less unusual instruments in the plating room. Diagrams. (L17, S general)

411-L. Benefits to the Plater of the American Electroplaters' Society Research Program. Earl J. Serfass. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 215-224; disc. p. 224-225.

Evaluation of the results of the AES Research Program. (L17, A9)

412-L. Some Engineering and Economic Aspects of the Disposal of Cyanide Plating Wastes. Barnett F. Dodge. *American Electroplaters' Society, Proceedings,* v. 39, 1952, p. 233-247; disc. p. 247-249.

Investigation to obtain necessary information to make cost analyses. Diagrams. (L17, A8)

413-L. Ford Foundry Cleaning Room Features Planned Efficiency. V. F. Stine. *American Foundryman,* v. 23, June 1953, p. 76-78.

Cleaning room designed to produce high-quality castings with the most modern mechanized equipment in surroundings providing the finest possible working conditions. Photographs. (L10, L12)

414-L. Polyvinyl Chloride Tape Approaches Ideal Material for Pipe Protection. George M. Carter, Jr. and T. J. Skotnicki. *American Gas Journal,* v. 179, July 1953, p. 14-15, 30-31.

Reviews requirements of preventing corrosion, properties of polyvinyl chloride, and application to pipe. (L26, CN)

415-L. Precision Tumbling Produces Fine Finish. Richard Depastina. *American Machinist,* v. 97, July 6, 1953, p. 113-115.

"Slidabrading" process for removing burrs and producing a smooth surface. (L10)

416-L. Ultrasonics. A Sound Method of Cleaning. Ray E. Homan. *American Machinist,* v. 97, July 6, 1953, p. 120-124.

Ultrasonic cleaning offers advantages on hard-to-clean, high-unit-cost items where absolute cleanliness is essential. Photographs. (L10)

417-L. Abrasives for Tumbling. *American Machinist,* v. 97, June 22, 1953, p. 155.

Tabulated data for abrasive media and additives. (L10)

418-L. Electronic Barrier Against Invisible Dirt. *Canadian Chemical Processing,* v. 37, June 1, 1953, p. 50, 52.

Advantages of the equipment for use when painting automobiles. (L26)

419-L. Rust Protection for Machined and Finished Parts. *Canadian Metals,* v. 16, June 1953, p. 22, 24.

Plastic, oil, thin film, and solvent types of rust preventatives. Application methods and fields of application. (L26)

420-L. Stauffer Chemical Stops Fan Corrosion With Silver Metallizing. *Chemical Processing,* v. 16, July 1953, p. 104-105.

Use of Ag, Mo, Ni, and Ta to prevent corrosion. Photographs. (L23, CI, Mo, Ni, Ag, Ta)

421-L. Production - Line Painting Methods. J. T. Pederson. *Electrical Communication,* v. 30, June 1953, p. 84-95.

Painting systems and controls used in finishing metal parts. Photographs. (L26, CN)

422-L. Formation of Immersion Zinc Coatings on Aluminum. W. G. Zelley. *Electrochemical Society, Journal,* v. 100, July 1953, p. 328-333.

Growth of process, corrosion of plated Al, deposition of the Zn film,

immersion solutions, and performance of plated Al. Diagrams. 17 ref. (L16, R general, Zn, Al)

423-L. The Mechanism of Electropolishing of Copper in Phosphoric Acid Solutions. I. Processes Preceding the Establishment of Polishing Conditions. J. Edwards. *Electrochemical Society, Journal,* v. 100, July 1953, p. 189C-194C.

Study to determine what conditions prevail at an anode undergoing polishing and how such conditions suppress crystallographic etching and promote smoothing. Tables, diagrams. (L13, Cu)

424-L. Potassium Versus Sodium in Plating and Cleaning Solutions. *Electroplating and Metal Finishing,* v. 6, June 1953, p. 197-200.

Na and K in Ag and cyanide Cu baths and in Cd, Zn, and Au solutions. Considers potassium stannate plating cost and availability. (L12, L17, Ag, Cu, Cd, Zn, Au)

425-L. Protection Against Corrosion of Steelwork in the Chemical Industry. *Electroplating and Metal Finishing,* v. 6; *Metal Spraying,* v. 3, June 1953, p. 228-230. (Translated and condensed from *Chemische Industrie,* v. 4, July 1952, p. 463-464.)

Advantages of using sprayed Zn followed by two coats of vinyl chloride paint. (L23, L26, Zn, ST)

426-L. Finishing Parts for Lighting Fixtures. A. G. Kling. *Industrial Finishing,* v. 29, June 1953, p. 24-26, 28, 30, 32.

Procedure for cleaning and painting. Photographs. (L general, Cu, ST)

427-L. Bright Metal Finishing by Vacuum Metal Evaporation. *Industrial Finishing,* v. 29, June 1953, p. 38-40, 42, 44.

Technique for metallic coating of plastics, textiles, metals, and alloys. Photographs. (L25, Au, Ag, Cu)

428-L. Finishing Slide Projectors. Joseph Plennert. *Industrial Finishing,* v. 29, June 1953, p. 50-52, 54.

Cleaning and painting processes. Photographs. (L general, Al, Zn, CI)

429-L. Here's How Hard Facing Rebuilds Earth Moving Equipment. Robert Dougherty. *Industry & Welding,* v. 26, July 1953, p. 38-40, 71-73.

Application of hard facing to prevent impact and abrasion wear. Photographs. (L24, Q9)

430-L. Priming Paints for Light Alloys. J. G. Rigg and E. W. Skerrey. *Institute of Metals, Journal,* v. 81, June 1953, p. 481-489.

Final results obtained after 3½ years from tests comparing the protective behavior of various paint primers on Al and Mg alloys and steel. Tables, photographs. (L26, Al, Mg, CN)

431-L. New Plating Process Expands Industrial Use of Gold. E. C. Rinker. *Iron Age,* v. 171, June 25, 1953, p. 131-133.

Developments in the process which resulted in lower cost, higher quality, and better durability for Au-plated surfaces. Photographs. (L17, Au)

432-L. Aluminum Surfacing Notes. Edward Engle. *Light Metal Age,* v. 11, June 1953, p. 16-18.

Container, sequence, agitation, racking method, neutralizing, dye problem, temperature, cooling, refrigeration, and time. (L general, Al)

433-L. The Process of Vitreous Enamelling and the Equipment Needed. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 92-93, 95-96.

Production of frit and application of enamel. Recently developed plant. (L27)

434-L. Tanks for Electroplating and Pickling. Frank Spicer. *Mechanical World and Engineering Record,* v. 133, June 1953, p. 266-268.

Selection of tanks to contain electroplating, pickling, and allied alkali or acid solutions. Use of new and established materials. Diagrams. (L17, L12)

435-L. Protective Finishing of Aluminum for Aircraft. Durward Armstrong. *Metal Progress,* v. 63, June 1953, p. 104-108.

Chemical films and application by dip and spray methods. Photographs. (L16, L23, Al)

436-L. Relation Between Roughness of Interface and Adherence of Porcelain Enamel to Steel. J. C. Richmond, D. G. Moore, H. B. Kirkpatrick, and W. N. Harrison. *National Advisory Committee for Aeronautics,* Washington, D. C., Technical Note 2934, Apr. 1953, 29 p.

Tests showed a correlation between roughness and adherence. Tables, graphs. (L27, CN)

437-L. "Araldite". A New Synthetic Resin for Surface Coating. *Organic Finishing,* v. 14, June 1953, p. 10-12, 17.

Preparation, pigmentation, properties, and uses of the resin. Tables. (L26, Al)

438-L. Metal Cleaning Equipment and Methods. II. John E. Hyler. *Organic Finishing,* v. 14, June 1953, p. 13-17.

Different methods to clean and dry metal equipment. Photographs. (L12)

439-L. Automotive Production Finishing. III. Rick Mansell. *Organic Finishing*, v. 14, June 1953, p. 19-21.
Wet sanding of primer-surfacer, insulating operations, the neutral sealer-coat, finishing room operations, and baking. Photographs. (L10, L26)

440-L. Solid Diffusion Gives a Nickel-Chromium Alloy Coating Over Low Carbon Steel. *Precision Metal Molding*, v. 11, July 1953, p. 56-57.
Technique and its advantages. (L15, Ni, Cr, CN)

441-L. Finishing Systems for Aluminum Die Castings. Russell V. Vanden Berg. *Precision Metal Molding*, v. 11, June 1953, p. 58-60, 63-65, 67, 88-91.
Polishing and buffing; barrel finishing; chemical treatments; electroplating; and anodic and organic coatings. (L general, Al)

442-L. Producing Decorated Drums. *Product Finishing*, v. 6, June 1953, p. 49-53.
"Rheecote" process for finishing American-type pails. Plant equipment. Photographs. (L26)

443-L. Finishes for Soft Soldering. Hot Tinning. E. E. Halls. *Product Finishing*, v. 6, June 1953, p. 59-66.
Applying a Sn or solder coating by hot dipping. Diagrams, tables. (L16, K7, Sn)

444-L. Hot Spray Limitations. E. Johnson. *Product Finishing*, v. 6, June 1953, p. 67-68, 102.
Points to be considered when employing hot spray techinques. Hints to operators of various types of equipment. (L26)

445-L. Coatings and Corrosion Research. *Product Finishing*, v. 6, June 1953, p. 74-76, 106.
Recent investigations by the British Iron and Steel Research Assoc. Includes pickling and acid recovery; heat treatment protection; electrochemistry of coatings; hot dipping process; coating metallurgy; and corrosion studies.
(L general, J general, R general)

446-L. Hot Spray Finishing of Machine Tools. Roy W. Hill. *Products Finishing*, v. 17, July 1953, p. 22-28, 30, 32.
Applying machine tool lacquer or enamel to cast iron, steel, and Al parts. Photographs.
(L26, Al, CI, ST)

447-L. New Sheet and Tin Plate Facilities for the West. *Western Machinery and Steel World*, v. 44, June 1953. p. 92-94.
Equipment described and illustrated. (L16, F23, Sn, CN)

448-L. Materials of Maximum Creep and Oxidation Resistance Produced by Coating Tungsten and Molybdenum With Vapor Deposited Silicon. E. Fitzer. Henry Brutcher Translation 2956, 27 pages.
Previously abstracted from *Berg- und Hüttenmännische Monatshefte*. See item 651-L. 1952.
(L15, H general, Mo, Si, W, SG-h)

449-L. (German.) **Anodic and Chemical Polishing as Preparation for Electrodeposition.** B. Wullhorst. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. A28-A32.
Polishing which removes macroscopic roughness, yields surfaces of high reflective potential, and supplements mechanical methods.
(L17, L12, L13)

450-L. (German.) **Lustrous Electrolytic Metallic Deposits.** E. Raub. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. p. B17-B25.
Formation of bright plates of vraious metals.
(L17, Ag, Ni, Cu, Zn)

451-L. (German.) **Active Carbon in Electroplating.** B. Wullhorst. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. B25-B29.
Carbon treatment of Ni baths in which low molecular substances are not absorbed and from which sulfonic acids can be separated.
(L17, Ni)

452-L. (German.) **Investigations on the Preece Test.** H. Bablik, F. Götzl, and E. Nell. *Metalloberfläche*, v. 7, no. 5, May 1953, p. A66-A72.
Unreliability of Preece test due to varying potentials of Zn deposits, varying Fe-Zn phases, oxide films, etc. Tables, micrographs, graphs, diagrams. (L17, Zn, Fe)

453-L. (German.) **Alloy Formation by Diffusion in the Case of Electrolytically Deposited Metals.** G. Wörwag. *Metalloberfläche*, v. 7, no. 2, Feb. 1953, p. B29-B32.
Influence of time and temperature on diffusion. Methods of hindering and achieving diffusion.
(L17, N1, Zn, Cu, Fe, Au, Ag)

454-L. (German.) **Density and Direction of Flow Patterns in Electrolytic Baths.** J. Steiner and M. Ruiner. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B69-B72.
How current flow lines can be controlled by arrangement, form, and size of electrodes. Diagrams. 9 ref. (L17)

455-L. (German.) **Substitute Coatings to Relieve the Scarcity of Nickel.** Heinz W. Dettner. *Metalloberfläche*, v. 7, no. 5, May 1953, p. B72-B74.
Results of plating with white brass, red bronze, Sn-Zn, and Sn-Ni. 9 ref. (L17, Ni, Cu, Sn)

456-L. (German.) Silicone Containing Metal-Polishing Pastes. W. Burkart and L. Gerl. *Metalloberfläche,* v. 7, no. 5, May 1953, p. B74-B76.
Silicone oils can improve quality and economy in metal polishing. Lowering of polishing temperature is beneficial to surfaces to be electroplated. Tables. 13 ref. (L10, L17, Al, Cr, Ni)

457-L. (German.) Coloring Cast Zinc. Hans Reininger. *Metalloberfläche,* v. 7, no. 5, May 1953, p. B76-B77.
French patent on method of dyeing cast zinc alloys. Tables. (L26, Zn)

458-L. Electropolishing. A. T. Steer, J. K. Wilson, and O. Wright. *Aircraft Production,* v. 15, July 1953, p. 242-249.
Influence on the fatigue-endurance limit of ferrous and nonferrous parts. (L13, Q7, CN, Ni)

459-L. A Study of Fishscaling Produced by Induction of Hydrogen Into Enameled Iron. E. E. Brvant, B. J. Sweo, G. E. Miller, and M. L. Simmons. *American Ceramic Society Bulletin,* v. 32, July 1953, p. 248-252.
Tests to determine fishscaling tendencies. Tables, photographs, graphs. 5 ref. (L27, ST, CI)

460-L. How to Prevent Ink Roller Stripping. *American Pressman,* v. 63, July 1953, p. 25-26.
New method of Cu-plating steel rollers to prevent roller stripping. (L17, Cu, ST)

461-L. Blistering of Enamels Due to Gas Evolution From Cast Iron. E. R. Evans. *British Cast Iron Research Association,* v. 4, June 1953, p. 586-589.
Blistering and factors affecting the formation of iron oxide and its reaction with graphite. 4 ref. (L27, R2, CI)

462-L. Pickling Equipment for Hand Galvanising. H. Rückemesser. *Draht* (English Ed.) June 1953, p. 50-52.
Auxiliary equipment which is indispensable for satisfactory pickling. Diagrams, photographs. (L12, Zn, CN)

463-L. Stainless Steel Spraying of Drums and Shafts in the Chemical and Food Industries. *Electroplating and Metal Spraying,* v. 6, July 1953, p. 267, 271.
Use of heavy coatings of stainless steel to withstand corrosive and abrasive conditions. Photographs. (L23, SS)

464-L. The Influence of Fuel Gas on the Spraying of Metal Powders. William McDermott and Robert Dickinson. *Engineer,* v. 196, July 3, 1953, p. 6-9.
Use of acetylene, methane, propane, butane; natural, coal, and enriched coal gas; and enriched propane for metal spraying. Chemical reactions in the flames and a hypothesis to explain why gases with widely different physical properties produce similar results. Tables. (L23)

465-L. Gas in the Lead Sheathing of Electricity Cables. *Gas Journal,* v. 275, July 8, 1953, p. 97-98.
Use of gas to melt Pb in the coating process. Tables, photographs. (L24, Pb)

466-L. Painting the New Republic Steel Kitchen Cabinets. Walter Rudolph. *Industrial Finishing,* v. 29, July 1953, p. 38-40, 42.
Preparation and finishing processes. Photographs. (L26, CN)

467-L. How to Prepare Aluminum for Painting. A. T. Thibadeau. *Industrial Finishing,* v. 29, July 1953, p. 60, 62, 67-68.
Cleaning processes and equipment. Photographs. (L26, L12, Al)

468-L. Mechanize Finishing to Cut Costs. Paul J. Straight. *Iron Age,* v. 172, July 16, 1953, p. 136-139.
Steel parts are chemically cleaned and phosphated before painting to inhibit rust and get better adhesion. Photographs. (L12, L14, ST)

469-L. Ultrasonics. The Answer to Aluminum Soldering? Leo Walter. *Materials & Methods,* v. 38, July 1953, p. 59-61.
Ultrasonic vibrations rapidly remove tough oxide film from Al surfaces. Improved tinning and better joint properties result. (L10, K7, Al)

470-L. Surface Contamination and Quality in Titanium Fabrication. V. C. Petersen. *Materials & Methods,* v. 38, July 1953, p. 72-73.
Procedures to minimize contamination resulting from cleaning and forming operations. Micrographs. (L10, L12, F general, Ti)

471-L. The Future of General Galvanizing. R. Lewis Stubbs and A. B. L. Chivers. *Metal Industry,* v. 82, June 26, 1953, p. 527-528.
Analysis of trends in the industry since 1945, possible competitive methods for protecting steel, and fields in which galvanizing could be more widely used. Tables. (L16, Zn, Al, CN)

472-L. For Electrical Uses: Silver Plated Aluminum Conductors. T. J. Connor and W. R. Wilson. *Modern Metals,* v. 9, July 1953, p. 50-54, 56.
Tests to determine advantages of the process. Photographs, diagrams. (L17, P15, Al, Ag)

473-L. A Flexible Plated Circuit. E. R. Bowerman and R. F. Walton. *Plating,* v. 40, July 1953, p. 765-766.
Materials and process for a cloth-backed plated circuit. Diagram, photographs. (L17, Cu, SS)

474-L. Nickel Plating of Aluminum Propeller Blades. *Plating,* v. 40, July 1953, p. 774-776.
Characteristics essential for plating, and the process. Photographs. (L17, Al, Ni)

475-L. Surface Treatment and Finishing of Light Metals. VIII. S. Wernick and R. Pinner. *Sheet Metal Industries,* v. 30, July 1953, p. 571-583.
Electrolytic and chemical polishing processes and industrial applications. Graphs, tables. 50 ref. (L12, L13, Al, Mg)

476-L. Factors Influencing the Selection of Metal Finishes. A. W. Wallbank. *Sheet Metal Industries,* v. 30, July 1953, p. 585-588, 590.
Purpose of finishes, fundamental factors, physical effects, service performance, appearance, and cost. (L general)

477-L. What to Plate. Allen G. Gray. *Steel,* v. 133, July 20, 1953, p. 84-88, 96.
Shows that available Ni is being stretched by substituting finishes such as Cu-Cr, Zn, and white brass to keep bright work on metal products. Tables, photographs. (L17, Ni, Cu, Cr, Zn)

478-L. British Streamline Tin Plate Lines. *Steel,* v. 133, July 27, 1953, p. 84, 86, 104.
Pickling, degreasing, annealing, temper rolling, and electrotinning. Photographs. (L17, L12, J23, F23, CN, Sn)

479-L. Tank Castings Get Shot Blasted. Erle F. Ross. *Steel,* v. 133, July 27, 1953, p. 106-107.
Shot blast equipment for big one-piece cast steel hulls for "Patton" tanks. Photographs. (L10, CI)

480-L. Ion-Free Water Makes Cents in Metal Finishing. Anthony Gigliotti. *Steel,* v. 133, July 13, 1953, p. 124.
Economies include reduction in amount of cleaning compound needed, elimination of hard-water precipitates, and fewer cases of under-film corrosion in enameling operations. (L12, L27)

481-L. Stellite in the Forging Industry. M. Riddihough and S. Grainger. *Welding and Metal Fabrication,* v. 21, July 1953, p. 242-244.
Depositing "Stellite" Alloy "C" and "6" to tools to prolong life. Photographs. (L24, Co, Ni)

482-L. Mollerizing Process Offers Anti-Rust Aluminum Coating. *Western Metals,* v. 11, July 1953, p. 44-46.
Process in which steel is coated with Al to prevent oxidation, peeling, and corrosion. Photographs. (L15, R general, Al, ST)

483-L. High Temperature Ceramic Coating for Jet Engines Replaces Critical Alloys. John V. Long. *Western Metals,* v. 11, July 1953, p. 54-56.
Development of coating used for stainless steels, low-alloy materials, and mild steels. Photographs. (L27, SS, CN)

484-L. (English, Spanish.) **Painting Methods for Modern Machinery.** *Machinery Lloyd (Overseas Ed.),* v. 25, July 4, 1953, p. 107-109.
Preparation for and application of paint on machinery. (L26, Al, Zn, ST, CI)

485-L. Inhibitors vs. Accelerators. The Theory and Use of Acid Inhibitors and Accelerators. W. Billingsley. **Acid Pickling and Depolarizers.** J. T. Irwin. **Inhibitors and Adjuncts.** Alfred Douty. *Wire and Wire Products,* v. 28, July 1953, p. 679-681, 717-718.
Action and merits of additions to pickling baths. (L12, CN)

486-L. (Dutch.) **Abrasives for Polishing Machines.** *Metalen,* v. 8, no. 5, Mar. 14, 1953, p. 120-121.
Various types of U. S. and European abrasives, especially "Cyldac" (cutwire). Advantages. Photographs. (L10, G19)

487-L. (Dutch.) **The Cleaning of Iron and Steel Before Applying an Organic Coating.** A. Groenendijk. *Metalen,* v. 8, no. 8, Apr. 30, 1953, p. 2-8.
Various methods and agents, especially the effect of phosphoric acid. Practical advantages of well-composed rinsing baths and applications. Photographs. (L10, L26, CI, ST)

488-L. (Dutch.) **Combatting Corrosion by Means of Thermohardening Lacquers.** W. L. Essed. *Plastica,* v. 5, no. 12, Dec. 1952, p. 368-373.
Various lacquers baked onto metal parts to reduce corrosion. Photographs, graphs. (L26, R general)

489-L. (French.) **Protective Chemical Treatment of Tin.** E. S. Hedges. *Metaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 171-174.
Improvement of the "Protectetain" method. Photographs. (L14, Sn)

490-L. (French.) **Comparative Fields of Application for Electrolytic White Iron and Quenched White Iron** W. R. Lewis. *Metaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 175-183.
Data, prices and advantages of electrolytic tinning on basis of

American processing. Diagrams, photographs. (L17, Sn)

491-L. (Book.) **American Electroplaters' Society, Proceedings, (Annual Volume),** v. 39, 1952. 272 p. American Electroplaters' Society, 445 Broad St., Newark, N. J.

Consists of papers abstracted separately, on various aspects of plating. (L17)

492-L. (Book.) **Handbook of Barrel Polishing.** 34 pp. 1953. R. Cruickshank Ltd., Camden Street, Birmingham 1, England. 10s.

Types of barrels and their uses in finishing. (L10)

493-L. (Book.) **Metal Cleaning Bibliographical Abstracts. New Ed.** Jay C. Harris, compiler. 132 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $4.25.

Material is presented in order to make published data on metal cleaning readily available to persons concerned with production, finishing, and maintenance of metal products. Several hundred new references bring the work up to date on all kinds of metal and most types of processes. (L10, L12, L13)

494-L. (Book.) **Painting Practice for Aluminum.** 19 p. Aluminum Development Assoc., 33 Grosvenor St., London, W.1, England.

Cleaning, degreasing, pretreatment, and paint finishes for Al. (L12, L26, Al)

495-L. (Book.) **Radiation Suppressing Coatings for Metals at Elevated Temperatures.** A. H. Sully, E. A. Brandes, and R. B. Waterhouse. 24 p. 1953. Fulmer Research Institute, Ltd., Stoke Poges, Buckinghamshire, England.

Describes tests determining the best coatings suited to reduce temperatures of metals. (L general, Ni, SS, CN)

496-L. (Book—German.) **(Chromium Plating Handbook.) Handbuch der Elektrolytischen Verchromung. Ed. 3.** Robert Bilfinger. 331 p. 1952. Fachbuchverlag Siegfried Schütz, Hanover, Germany. 23 DM.

Revised edition is enlarged to include sections on theory and decorative plating. Original title was "Hart Verchromungs Verfahren", (Hard Chromium Plating Procedure). (L17)

497-L. The Manufacture of Tinplate. E. A. Lancaster. *Canadian Metals,* July 1953, p. 16, 18.

Hot dip and electrolytic methods. (L16, L17, Sn, CN)

498-L. Chromium Plating for .50-In. Gun Barrels. *Canadian Metals,* v. 16, July 1953, p. 38-39.

Plating procedure, bath installation and lead electrodes. Photograph. (L17, Cr)

499-L. Present Trends in Automobile Finishing. Sophur Bolme. *Chemistry in Canada,* v. 5, July 1953, p. 34-35.

Excerpts from paper presented at the 36th Annual Conference, The Chemical Institute of Canada, Windsor, June 4-6, 1953. Trends in metal preparation, undercoats, colors and lacquers. (L26)

500-L. Abrasive Liquid Polishing of Hollow Cylinders. E. A. Satel. *Engineers' Digest,* v. 14, July 1953, p. 250. (Translated and condensed from *Stanki i Instrument,* no. 9, 1953, p. 26-27.)

Equipment. Diagrams. (L10, AY)

501-L. Producing Pressed Steel Bathtubs and Sinks at Norris-Thermador. Gilbert C. Close. *Finish,* v. 10, Aug. 1953, p. 23-26, ST20-ST21.

Finishing processes. Photographs. (L general, CN)

502-L. New Facilities Speed Production of the Lovell Drying System. Walter Rudolph. *Finish,* v. 10, Aug. 1953, p. 35-37, ST11.

Fabrication, finishing, assembly, handling and packaging of clothes dryers. (L general)

503-L. Cleaning Cast Steel Armor. Erle F. Ross. *Foundry,* v. 81, Aug. 1953, p. 178, 180-181.

Blasting large armor parts. Photographs. (L10, CI)

504-L. Vacuum Metallizing of Plastics. J. Gordon Seiter. *India Rubber World,* v. 128, July 1953, p. 493-496.

Equipment, process and applications. Uses Al as an example. Photographs. (L25, Al)

505-L. Aluminum Bronze Overlay Lengthens Life of Steel Processing Equipment. W. F. Stewart. *Industry & Welding,* v. 26, Aug. 1953, p. 76, 78.

Photographs. (L24, Al, SS, AY, CN)

506-L. Attenuation and Surface Roughness of Electroplated Waveguides. F. A. Benson. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. 3, July 1953, p. 213-216.

Study made of surface roughness of various sizes of waveguide tubing when electroplated internally. Merits of different types of electroplate and effects of variations in plating thickness and current density. Micrographs. 11 ref. (L17, S15)

507-L. Finishing Flat Surfaces on Small Quantity-Produced Components. *Machinery (London),* v. 83, July 17, 1953, p. 115-116.

Apparatus for finishing process. (L general)

508-L. Some Typical Applications of the Fescol Electro-Deposition Process. *Machinery (London),* v. 83, July 24, 1953, p. 161-167.

Reclaiming worn components and Cr deposition on broaches and Al. Photographs. (L17, Al, Cr, TS)

509-L. The Effect of Chromium Plating of Steel on the Fatigue Limit. I-II. George M. Cabble, Jr. *Metal Finishing,* v. 51, June 1953, p. 106-108; July 1953, p. 60-63.

Fatigue limit of AISI 4340 steel with different thicknesses of plating. Graphs. 12 ref. (L17, Q7, Cr, ST)

510-L. Experimental Plating of Internal Engine Parts. George W. Grupp. *Metal Finishing,* v. 51, July 1953, p. 53-55.

Development of a single metal protective coating for steel parts. (L17, Cd, Sn, Pb, Cr)

511-L. How to Combat Pipe-Line Corrosion. *Oil and Gas Journal,* v. 52, July 27, 1953, p. 363.

Use of coatings to prevent corrosion. (L general, R10)

512-L. Metal Cleaning Equipment and Methods. III. John E. Hyler. *Organic Finishing,* v. 14, July 1953, p. 14-18.

Equipment and techniques for combined cleaning operations utilizing automatic transfer, cycle washers, drum washers, and specialized systems. Types of agitation and other cleaning methods. Photographs. (L10, L12)

513-L. Metal Coating for Plastics. *Plastics,* v. 18, July 1953, p. 248-250.

Importance of correct selection and methods of applying lacquers to the moldings before coating and to the finished metallized article. Relative merits of various metal coating techniques. Photographs. (L23)

514-L. How to Use Steel Balls and Shapes for Barrel Finishing. R. M. Terry. *Precision Metal Molding,* v. 11, Aug. 1953, p. 46-52.

Barrel finishing with steel balls and special shapes. Methods, materials and process details. Photographs. (L10, ST)

515-L. Tin-Nickel Alloy Plating Current Progress. *Tin and Its Uses,* June 1953, p. 10-11.

General modifications in technique. (L17, Sn, Ni)

516-L. Ultrasonics for Metal Cleaning. *Western Machinery and Steel World,* v. 44, July 1953, p. 98.

Description. Photographs. (L10)

517-L. (French.) **Comparison of Results Obtained by Chemical and Anodic Polishing of Aluminum Surfaces.** A. Fischer and L. Koch. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 131-135.

Studies were made under the electron microscope to compare E. W. chemical brightening process with V.A.W. anodic process. Tables, photographs. 7 ref. (L14, L19, Al)

518-L. (German.) **"Sanding" on the Surface of Hot-Galvanized Sheet Metal.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 902-906.

"Sandy" roughness on Zn-plated sheet metal caused by undissolved hard Zn deposits and defective sheet metal surfaces. Photographs. (L16, Zn, CN)

519-L. (German.) **"Tear" Formation on Zinc-Plated Sheet Metals.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 906-908.

Studies made to determine the cause of tear-drop shaped agglomerations of Zn on the surface. Photographs. 3 ref. (L16, Zn, CN)

520-L. (German.) **High-Temperature Resistant Materials Obtained by Siliconizing Tungsten and Molybdenum.** E. Fitzer. Paper from "Plansee Proceedings 1952", Metallwerk Plansee G.m.b.H., p. 244-253; disc., 253-258.

Advantages of the process which protects metals against oxidation. Micrographs, graphs. (L15, W, Mo)

521-L. (Russian.) **Use of Direct Current in Electrometallizer EM-3.** A. M. Edel'son. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 23.

Use of d.c. instead of a.c. increased production 2.5 times and improved the quality of coating. (L17)

522-L. (Russian.) **Determination of the Coefficients of Cathodic Sputtering of Metals by Ions of the Same Metals.** L. N. Dobretsov and N. M. Karnauchova. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 4, Aug. 1, 1952, 745-748.

Dependence of cathode sputtering of Cu, Mn, Fe and Pb on the ion energy. Tables, graphs. Ref. (L25, Cu, Mn, Fe, Pb, Sn)

523-L. (Russian.) **Automatic Device APT-2 for the Control of Current Density and Time of Electroplating Processes.** V. L. Gembol. *Promyshlennaia Energetika,* v. 9, no. 9, Sept. 1952, p. 11-14.

Circuit drawings. (L17)

524-L. Anodic Formation of Coatings on Magnesium, Zinc, and Cadmium. Kurt Huber. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 376-382.

Paper given at the Philadelphia Meeting of the Electrochemical Society, May 4-8, 1952. Report of investigations of anodically formed coatings on Mg, Zn and Cd in NaOH and Na_2CO_3 solutions. Growth of the coatings was studied by X-ray and electron diffraction and electron microscopy. Micrographs, graphs. (L19, Mg, Zn, Cd)

525-L. The Mechanism of Electropolishing of Copper in Phosphoric Acid Solutions. II. The Mechanism of Smoothing. J. Edwards. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 223C-230C.

Qualitative and quantitative study of smoothing action. Diagrams, graphs. (L13, Cu)

526-L. Coated Steels Can Cut Breakage on Drawn Parts. N. E. Hays. *Iron Age,* v. 172, Aug. 13, 1953, p. 135-137.

Advantages offered by Zn and phosphate-coated steels. Photographs, micrographs. (L14, L16, G21, Zn, ST)

527-L. Selecting Protective Coatings for Metals. John B. Campbell. *Materials & Methods,* v. 38, Aug. 1953, p. 109-124.

Corrosive environment, mechanical durability, appearance and cost. Conversion, organic, metallic and vitreous coatings. Photographs. (L general, R10)

528-L. (French.) **Cast Iron. Contribution to the Study of Diffusion Coating.** Andre Guédras. *Métallurgie et la Construction Mécanique,* v. 84, no. 12, Dec. 1952, p. 929, 931, 933-934, 937, 939; v. 85, no. 1, Jan. 1953, p. 27, 29-31, 33; no. 2, Feb. 1953, p. 105, 107, 109-110; no. 3, Mar. 1953, p. 181, 183, 185-186, 189; no. 4, Apr. 1953, p. 269-270, 273.

Part I: Surface treatments for solid-liquid cast iron. Part II: Theory of cementation and cementation by substances other than C. Part III: practical industrial applications. Part IV: Composition and properties of metals. Diagrams, photographs. 10 ref. (L15, J28, CI)

529-L. (French.) **Electrolytic Zinc Plating.** J. Liger. *Métallurgie et la Construction Mécanique,* v. 85, no. 4, Apr. 1953, p. 301, 303, 305.

Problems associated with bright, alkaline and acid baths. (L17, Zn)

530-L. (French.) **A Great Achievement in the Struggle Against Corrosion. Lead Cyanamide.** Roger Delmas. *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 497, 499, 501.

Progress and efficacy of $PbCn_2$ coatings. Tables. 14 ref. (L14, Pb, CN)

531-L. (French.) **Hot Tinning.** G. Haas and A. Gordet. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 401, 403; no. 6, June 1953, p. 501, 503, 505.

Part II: Preparation of metal surfaces with hydrofluoric acid, and method of protecting the walls of vessels with vinyl polychloride. Part III: Importance and composition of good fluxes in the tinning of metals. (L16)

532-L. (German.) **Anodized Patterns on Aluminum.** E. Herrmann. *Aluminium,* v. 29, no. 5, May 1953, p. 194-197.

Application of special surface effects on the preservation coatings on Al. 28 ref. (L19, Al)

533-L. (German.) **Vitreous Enamels on Aluminum.** *Aluminium,* v. 29, no. 5, May 1953, p. 200-202.

Composition and fabrication of fritted enamels, applicability, materials, pretreatment, enameling process, characteristics and applications. Photographs, graphs. 5 ref. (L27, Al)

534-L. (German.) **Liquid Noble-Metal Preparations for Metallizing of Ceramic Materials and Plastics.** M. Kollmar. *Metall,* v. 7, nos. 11/12, June 1953, p. 427-429.

Composition, preparation and application of noble metal coatings for condensers, spools and resistances. Soft solder compounds and bases for electroplating. (L23, EG-c)

535-L. (German.) **Remarks on Chemically Reactive Primers and Rust-Protecting Agents.** Von Bernhard and F. H. Scheifele. *Werkstoffe und Korrosion,* v. 4, no. 6, June 1953, p. 208-209.

Modern primers that contain an acid which reacts with the metal to form a corrosion resistant dense coat and a highly adhesive surface for the top coat of paint. (L26)

536-L. (Russian.) **Reduction of Rust by Currents of Constant Density.** A. S. Afanas'ev. *Zhurnal Prikladnoi Khimii,* v. 26, no. 2, Feb. 1953, p. 170-177.

Removal of rust without loss of metal in alkaline solutions. Graphs. 13 ref. (L12, CN)

537-L. Investigation of Gases Evolved During Firing of Porcelain Enamels. Dwight G. Moore and Mary A. Mason. *American Ceramic Society, Journal,* v. 36, Aug. 1953, p. 241-249.

Examination of gas evolution, fired specimens for changes in bubble structure, changes in normal gas evolution when water-free enamels are used, trapped gases, sources

of carbon gases and effect of pretreatments of the clay. Tables. (L27)

538-L. Galvanizing of Small Metal Parts. G. Steiner. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 452-454.

Installation with which it is possible to centrifuge galvanized parts immediately after removing them from the Zn bath. Diagram, photograph. (L16, Zn, CN)

539-L. More Uniform Surfaces Produced With Alumina Spray. *Chemical and Engineering News,* v. 31, Aug. 10, 1953, p. 3284.

Waterblast process for bearing surfaces and coating preparation. (L23)

540-L. Paint Coating Thickness Meters. R. Quarendon. *Engineer,* v. 196, July 31, 1953, p. 130-133.

Design, use and limitations of meters. Photographs. (L26, S14)

541-L. The Fight Against Corrosion. *Material Flow,* v. 8, Aug. 1953, p. 112, 114-115, 126, 128.

Water, moisture vapor, and greaseproof flexible barriers. Photographs. (L26)

542-L. Electrodeposition of Tin-Nickel Alloys. *Metal Finishing,* v. 51, July 1953, p. 64-69.

Previously abstracted from *Electrochemical Society, Journal.* See item 168-L, 1953. (L17, Sn, Ni)

543-L. Stripping Phosphate Coatings. Radiometric Evaluation of a New Stripping Solution. Stanley L. Eisler and Jodie Doss. *Metal Finishing,* v. 51, Aug. 1953, p. 58-63.

Testing method. (L14, S19)

544-L. Anodes for Electroplating. A. C. West. *Metal Finishing,* v. 51, Aug. 1953, p. 66-70, 74.

Common forms of anodes used in Cu, Cd, Zn and Ni plating. Selection of anode length and problem of insoluble anode surface. Tables. (L17, Cu, Cd, Zn, Ni)

545-L. Porcelain Enamel. Orphan of the Metal Finishing Industry. Eugene M. Smith. *Metal Finishing,* v. 51, Aug. 1953, p. 71-74.

Characteristics and uses. Photographs, table. (L27, CN)

546-L. Electrodeposition of Uranium Oxide on Aluminum. Carl R. Wilson and A. Langer. *Nucleonics,* v. 11, Aug. 1953, p. 48.

(L17, Al)

547-L. Bright Gold Plating. Edwin C. Rinker. *Plating,* v. 40, Aug. 1953, p. 861-866; disc., p. 866-867.

New process which eliminates buffing and has greater uniformity of deposit distribution. Tables, micrographs. (L17, Au)

548-L. Statistical Quality Control. A New Tool for the Electroplater. Ezra A. Blount. *Plating,* v. 40, Aug. 1953, p 868-872; disc., p. 872-873.

Control of solution composition and pH. Recording and control of rejected parts. Examples in two plating installations. Graphs, photographs. 10 ref. (L17, S12)

549-L. Iron Plating From an Alkaline Bath. Edward F. Foley, Jr., Henry B. Linford, and Walter R. Meyer. *Plating,* v. 40, Aug. 1953, p. 887-892; disc., p. 892-893.

Data on effects of both components on cathode efficiency and operating characteristics. Tables, graphs. 5 ref. (L17, Fe)

550-L. Current and Metal Distribution in Electrodeposition. III. Experimental Determination of Metal Distribution. John Kronsbein. *Plating,* v. 40, Aug. 1953, p. 898-901.

Effects of fillet radius and shank length in plating on recessed surfaces. Graphs, photograph. (L17)

551-L. More on Metal Coatings. L. G. Jones. *Power Engineering,* v. 57, Aug. 1953, p. 74-75.

Corrosion effects and galvanizing versus Cd-plating. Tables, photograph.

(L16, L17, Cn, Ni, Cu, Al, Sn, Pb, AY)

552-L. Finishes for Soft Soldering. Fused and Flowed Coatings of Electrotin. E. E. Halls. *Product Finishing,* v. 6, July 1953, p. 52-58, 120.

Methods of treating electrotinned products to have same desirable qualities as hot-dipped articles. (L16, Sn)

553-L. Problems of Paint Adhesion. E. Johnson. *Product Finishing,* v. 6, July 1953, p. 61-64, 120.

Causes and cures for poor paint adhesion on Zn, Fe, Pb, Al and Mg. (L26, Zn, Fe, Pb, Al, Mg)

554-L. Statistical Quality Control Improves Efficiency of Chromium Plating Operation. Frank L. Bonem. *Products Finishing,* v. 17, Aug. 1953, p. 24-28, 30, 32, 34, 36.

Use in production of International Harvester cotton-picker spindles. System is applied to three automatic plating baths. (L17, S12, Cr)

555-L. How to Protect Magnesium Against Wear. *SAE Journal,* v. 61, Aug. 1953, p. 37-39.

Based on paper "Wear Characteristics of Mg" by E. L. Schaper, presented at SAE Annual Meeting, Detroit, Jan. 13, 1953. Electroplating with Cr or Cu, anodic treatment and spray coatings. Tables, photographs. (L17, L19, L23, Cr, Cu, Mg)

556-L. The Distribution of Aluminium in Industrial Galvanizing Baths.

N. B. Rutherford. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 657-660, 680.

Determines that vertical segregation may occur. Diagrams, tables. 18 ref. (L16, Zn, Al)

557-L. Modern Industrial Finishes for Sheet-Metal Products. H. J. Testro. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 665-668, 680.

Main types of organic coating materials for industrial sheet-metal and allied products. (L26)

558-L. Spotlighting Finishing Progress. Seymour Senderoff. *Products Finishing,* v. 17, Aug. 1953, p. 54-56, 58, 62, 64, 66, 68, 70, 74, 76, 78, 80, 82, 86, 88, 90, 92, 94.

Four recent papers are discussed: "Electrodeposition of Alloys", by E. Raub; "Tin-Nickel Alloy Plates", by N. Parkinson and H. P. Rooksby; "A High-Conductivity Glass-To-Metal Seal", by J. C. Turnbull; and "Aluminum Plating", by W. Menzel. The first and last articles are translations from German and the article by E. Raub was previously abstracted from *Metalloberfläche,* (item 450-L, 1953.)
(L general, Cu, Au, Mo, W, Ni, Ag, Pb, Zn, Bi, Sb, Cd, Sn, Cr, Rh, Al)

559-L. Stainless Strip Descaled and Brightened Continuously. Lorenz H. Wilson. *Steel,* v. 133, Aug. 10, 1953, p. 96-98.

Equipment and method to anneal, descale, and electropickle the strip. Diagrams, photographs. (L12, J23, SS)

560-L. Coating Steel With Aluminum. I. and II. *Steel,* v. 133, Aug. 3, 1953, p. 98-101, 128; Aug. 10, 1953, p. 138-140, 142.

Adapted from "Aluminum in Iron and Steel" by Samuel L. Case and Kent R. Van Horn, (item 152-B, 1953). Several techniques. Choice depends on purpose of coating and type of part. Details of hot dipping. (L17, Al, C)

561-L. Vacuum Process Brightens Plating Picture. George A. Goetz. *Steel,* v. 133, Aug. 17, 1953, p. 166-167.

Vacuum coating, advantages and uses. (L25)

562-L. Get the Most From Your Wire Enameling Dies. Richard Bliss. *Wire and Wire Products,* v. 28, Aug. 1953, p. 784-787, 812, 813, 815, 817.

Proper use of dies to obtain desired thickness of film on wire. Photographs, diagram. (L27)

563-L. (German.) **Improvement of Plastics. Plastics are Metallized.** L. Hiesinger. *Umschau in Wissenschaft und Technik,* v. 53, no. 13, July 1, 1953, p. 403-405.

Coating of palstic materials and textiles with metal by the vapor deposition process. Photographs, tables, diagrams. (L25, Al, Au, Zn)

564-L. A Practical Manual of Hard Surfacing. Steve Elonka. *American Machinst,* v. 97, Aug. 17, 1953, p. 113-128.

Types of wear and influence of hardness. Techniques for hard facing including electric-arc, oxy-acetylene torch, spraying and paste applications. Photographs, diagrams. (L24, Q9)

565-L. Cast-Iron Pipe Coatings and Corrosion. John R. Baylis. *American Water Works Association, Journal,* v. 45, Aug. 1953, p. 807-831.

Corrosion of CI pipe coated with coal-tar. Diagrams, photographs, micrographs. (L26, R7, CI)

566-L. Heat Radiation Suppression. *Automobile Engineer,* v. 43, Aug. 1953, p. 323-324.

Measurement of the total emissivity of metal surfaces and refractory coatings, and the variation of emissivity with particle size and thickness of coating. Methods of bonding refractory coatings to metal surfaces; coating compositions and methods of application. Fatigue and other tests were made to determine the behavior of coatings under simulated service conditions. Graphs. (L27, P11, Q7)

567-L. Some Analyses on the Electro-Polished Surface. Fusao Hayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 52-54.

Compares luster of electropolished and mechanically finished surfaces. Graphs, table, diagram. (L13, L10, CN)

568-L. Obviates Need for Hydrofluoric Acid in Many Pickling, Etching Operations. *Chemical Processing,* v. 16, Sept. 1953, p. 34-49.

Use of "Actane 33" to replace HF. (L12)

569-L. Chlorine Gas and Molten Aluminum Resisted by Ceramic Coating. *Chemical Processing,* v. 16, Sept. 1953, p. 148-159.

Porcelain enameled steel pipe. (L27, CN)

570-L. Refractory Materials for the Vitreous-Enamelling Industry. R. J. Slawson and J. F. Clements. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 179-186.

Paper presented to the Institute of Vitreous Enamellers. How refractories are used, desirable properties required for each use, and suitable types. Photographs. (L27)

571-L. Finishing Rheem Water Heaters. James F. Vokral. *Industrial*

Finishing, v. 29, Aug. 1953, p. 22-24, 27.

Enamelling process, including quality control of raw materials, cleaning of metal surfaces, spraying methods and baking. Photographs. (L27, CN)

572-L. New Machine Polishes Zinc Diecast Parts Automatically. Herbert Chase. *Iron Age,* v. 172, Aug. 20, 1953, p. 136-137.

Apparatus for polishing 2000 car door handles per hr. Photographs. (L10, Zn)

573-L. A Guide to the Painting of Aluminium Structures and Articles. W. A. Edwards. *Light Metals,* v. 16, Aug. 1953, p. 267-268.

Characteristics and properties of various coatings on Al. (L26, Al)

574-L. Shot Blasting. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 1953, p. 68-70.

Process and equipment. Diagrams. (L10)

575-L. The Case for Tin-Nickel Alloy Plating. J. W. Cuthbertson. *Metal Industry,* v. 83, July 31, 1953, p. 89-91.

Problems in transferring the process from the laboratory to practice. Demonstrates practicability of the process and its advantages. Diagram. 3 ref. (L17, Sn, Ni)

576-L. Trends in Better Finishes for Automobiles. John Parina, Jr. *Metal Progress,* v. 64, July 1953, p. 83-86.

Use of Sn-Ni alloy, bright white brass, Sn-Cu, Sn-Zn, Cr, and Al. Electroplates, dip and organic coatings.
(L general, Sn, Ni, Cu, Zn, Cr, Al)

577-L. Process for Aluminum Plating From Nonaqueous Solution. Dwight E. Couch and Abner Brenner. *Metal Progress,* v. 64, July 1953, p. 126-128.

Previously abstracted from original in *Journal of the Electrochemical Society.* See item 592-L, 1952.
(L17, Al)

578-L. Evaluation of Surfactants. Radiometric Evaluation of the Efficiencies of Various Surfactants in Displacing Water From Steel. J. E. Smallwood and Stanley L. Eisler. *Soap and Sanitary Chemicals,* v. 29, Aug. 1953, p. 48-51, 101, 102.

Results are reported for 89 materials, using $Na_2S_{35}O_4$ as soiling agent. Data may help in evaluating water displacement powers of rust preventives. Tables. 3 ref.
(L14)

579-L. Surface Finishing Stainless Steel. *Steel,* v. 133, Aug. 24, 1953, p. 82-83.

Buffing and polishing. Photographs, table. (L10, SS)

580-L. Hard Facing. H. O. Jones. *Welding Journal,* v. 32, Aug. 1953, p. 746.

Oxy-acetylene and arc hard-facing processes. Photographs. (L24)

581-L. Sandblasting and Annealing to Improve Flame-Cut High-Tensile Steel. A. Erker. *Welding Journal,* v. 32, Aug. 1953, p. 402S-412S.

Translated and condensed from *Schweissen und Schneiden.* See item 528-Q, 1953. (Q general, G22, Cr)

582-L. (German.) **Protection of Metal Surfaces.** A. Foulon. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 109-110.

Advantages and disadvantages of different types of protective coatings on ferrous metals.
(L general, Fe)

583-L. (German.) **Anodic Oxidation and Pigmentation of Aluminum.** W. Philippi. *Metalloberfläche,* Ausgabe B, v. 5, no. 7, July 1953, p. 111-113.

Anodizing, tinting and polishing of Al parts and products. (L19, Al)

584-L. (Russian.) **Opaque Glazes for Sanitary Fixtures.** Z. A. Nosova, and M. E. Iakovleva. *Steklo i Keramika,* no. 3, Mar. 1953, p. 11-17.

Effects of different composition and firing temperatures on the quality of opaque glazes. Graphs, photographs, tables. (L27, CI)

585-L. Contact Immersion-Plating. J. K. Wilson and O. Wright. *Aircraft Production,* v. 15, Sept. 1953, p. 329-334.

Contact-tinning and compares product with electrotinning. Photographs, micrographs. 7 ref.
(L16, L17)

586-L. Study of Some Phenomena Associated With the Adherence of Sheet Iron Ground Coats. R. F. Patrick, E. G. Porst, and G. H. Spencer-Strong. *American Ceramic Society, Journal,* v. 36, Sept. 1953, p. 305-313.

Deposition and adherence of Co and Ni on base metals during firing of sheet iron ground coats. Graphs, tables, micrographs. 11 ref.
(L27)

587-L. Report of Committee B-8 on Electrodeposited Metallic Coatings. C. H. Sample, chairman. *American Society for Testing Materials.* Preprint no. 14, 1953, 25 p.

Recommendations for revision of specifications and report of subcommittee on performance tests.
(L17, S22, Cu, Ni, Cr)

588-L. Automatic Controls for Surface Finishing Jet Engine Parts. R.

J. Thomas. *Automotive Industries,* v. 109, Sept. 1, 1953, p. 48-50.

Finishing processes. Diagrams, photographs. (L general)

589-L. Development and Manufacture of Electroformed Conductor for Telephone Drop Wire. A. N. Gray and G. E. Murray. *Bell System Technical Journal,* v. 32, Sept. 1953, p. 1099-1135.

Plant for continuous plating of Cu on steel wire. Photographs, table. (L17, Cu, CN)

590-L. Vacuum Metallization for Surface Coating. *Canadian Metals,* v. 16, Sept. 1953, p. 42, 44.

Commercial applications of deposition of metals in vacuum. Many metals can be deposited on a variety of materials provided proper surfaces are prepared. (L25)

591-L. The Electrochemistry of the First Layers of Electrodeposited Metals. T. Mills and G. M. Willis. *Electrochemical Society, Journal,* v. 100, Oct. 1953, p. 452-458.

Variations in nature of binding of Pb to underlying Au and Ag studied by means of charging curves. Apparatus, technique, and experimental data. Diagram, graphs. 18 ref. (L17, Pb, Ag, Au)

592-L. Control of Electric Current and Related Variables in Plating and Anodising. *Electroplating and Metal Finishing,* v. 6, July 1953, p. 235-244; Aug. 1953, p. 285-289.

Basis and methods of control and plating rectifiers and generators. Factors involved in linking current control with control of other variables. Photographs, diagrams. (L17, L19)

593-L. Modern Industrial Rhodium Plating. R. Pinner. *Electroplating and Metal Finishing,* v. 6, Aug. 1953, p. 276-281.

Applications, preparation of solution, operating conditions, effect of impurities and equipment. Graphs, tables, photographs. 18 ref. (L17, Rh)

594-L. The Stripping of Plating Shop Rejects. C. D. Leonard. *Electroplating and Metal Finishing,* v. 6, Aug. 1953, p. 290-292, 296.

Recommended methods. (L12)

595-L. Production Plating of Aluminium and Its Alloys. Bernard E. Bunce. *Electroplating and Metal Finishing,* v. 6, Sept. 1953, p. 317-323.

Method using H_3PO_4 anodizing pretreatment. Recommendations for anodizing and plating solutions. (L19, L17, Al)

596-L. A Sound "Insurance Policy" for Pipe Protection. Wayne H. Schultz. *Gas,* v. 29, Sept. 1953, p. 113-114.

Advantages and application techniques of cold-applied coatings. Photographs. (L general)

597-L. Hot Spraying. Joseph A. Sanches. *Industrial Finishing,* v. 29, Sept. 1953, p. 52, 54, 56.

Alkyd and solvent-type finishes. (L26)

598-L. Difficult Galvanizing Jobs Done in New Radiant Furnace. Robert C. Boehnke. *Industrial Heating,* v. 20, Sept. 1953, p. 1702, 1704, 1706, 1842.

More uniform coatings on wide range of hot dipped products and valuable savings in dross formation, fuel consumption and maintenance have resulted from installation of new type radiant gas-fired galvanizing furnace. Photographs, diagram. (L16)

599-L. Automatic Paint Spray System Featured in Nash Motors Finishing Line. *Industrial Heating,* v. 20, Sept. 1953, p. 1776-1780, 1782, 1784-1788.

Spray booths used for finishing front-end assemblies. Photographs. (L26)

600-L. Chemical Cleaning of Boilers. Richard B. Conlan. *Industry and Power,* v. 65, Sept. 1953, p. 76-79.

Alkaline boil-out, acid cleaning, and "fill and soak" methods. Photographs, diagrams. (L12)

601-L. "Plastic Alloys" Provide Low Cost, Corrosion-Resistant Finish. W. G. Patton. *Iron Age,* v. 172, Sept. 10, 1953, p. 159-162.

Applications of vinyl plastisol coatings on metals. Photographs. (L26)

602-L. Better Tumbling Methods Cut Parts Finishing Costs. I. Wayne Stone. *Iron Age,* v. 172, Sept. 24, 1953, p. 117-121.

Photographs. (L10)

603-L. Maintenance Painting of Steel and Coke Oven Plants. S. C. Frye. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 83-88; disc., p. 88-89.

Types, methods, preparation of surfaces and problems in painting buildings and equipment to prevent corrosion. Photographs. (L26, R10)

604-L. Chromium Plating in Steel Plants. John B. Allen and Jerome D. Tulloch. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 90-94; disc., p. 94-97.

Use of Cr electroplating of machinery for corrosion prevention. Photographs. (L17, R10, Cr)

605-L. Infrared Offers Economies in Continuous Process Heating. I. J.

Barber. *Iron Age,* v. 172, Oct. 1, 1953, p. 97-101.

Advantages for drying and baking organic finishes. Typical installations. Photographs, charts. (L26)

606-L. Electrostatic Spray Method Primes Car Bodies. Herbert Chase. *Iron Age,* v. 172, Oct. 1, 1953, p. 102-103.

Equipment and advantages. Photographs. (L26)

607-L. Recent Developments in the Plating of Aluminium. *Light Metals,* v. 16, Sept. 1953, p. 311-313.

Describes and criticizes preferred techniques. Tables. 29 ref. (To be continued.) (L general, Al)

608-L. Designing Electroformed Parts. William H. Metzger, Jr. and Vernon A. Lamb. *Machine Design,* v. 25, Sept. 1953, p. 124-131.

Electroforming applications, types of mandrels, design factors and metal selection. Tables, diagrams, photographs. (L18)

609-L. New Developments. HAE Finish for Magnesium. H. A. Evangelides. *Magnesium,* v. Aug. 1953, p. 2-6.

Properties of HAE coating and test results. Coating can be applied to all Mg alloys. (L14, Mg)

610-L. New Plating Plant for Union Switch & Signal. *Metal Finishing,* v. 51, Sept. 1953, p. 61-64.

Plant layout and equipment. Photographs, diagram. (L17)

611-L. Inhibitors for Metal Finishing. R. O. Bailey. *Metal Finishing,* v. 51, Sept. 1953, p. 65-68.

Use of inhibitors in pickling baths. Photographs. (L12, ST)

612-L. Electroless Nickel. Harry J. West. *Metal Finishing,* v. 51, Sept. 1953, p. 68.

Production methods and results. (L16, Ni)

613-L. Protective Anodizing of Highly Reflective Aluminum. Sakae Tajima, Yasuyuki Kimura, and Toshiro Fukushima. *Metal Finishing,* v. 51, Sept. 1953, p. 69-73.

Brightening method, anodizing with various electrolytes, effects of current density and decrease of reflectivity with anodizing time. Photographs, graphs, tables. 9 ref. (L19, Al)

614-L. Plating Through a Slot. J. B. Mohler. *Metal Industry,* v. 83, Sept. 11, 1953, p. 219-222.

Method and advantages. Diagrams, tables. 9 ref. (L17)

615-L. Phosphate Coatings on Steel Surfaces. H. A. Holden. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 71-77, 90.

Different types of coatings and their applications in the fields of corrosion protection, wear prevention, and cold working lubrication. Micrographs, photographs. 19 ref. (L14, ST)

616-L. Plating Waste Treatment. C. F. Paulson. *Metal Progress,* v. 64, Aug. 1953, p. 84-87.

Recovery of electroplating wastes by using ion exchange processes. Photograph, table, diagram. (L17, A8)

617-L. Metal Finishing by High-Vacuum Metallization. George H. Bancroft. *Metal Progress,* v. 64, Sept. 1953, p. 87-90.

Details of process, including coating of object with lacquer, evaporation of metal in high vacuum, and coating with lacquer and baking. Photographs, diagram. (L25)

618-L. Organic Finishes Protect Silver. Floyd H. Meller and Irene Donnelly. *Organic Finishing,* v. 14, Aug. 1953, p. 16-18.

Types of lacquers and successful pretreatments. (L26, Ag)

619-L. Protective Coatings in Paper and Pulp Mills. R. R. Kelly. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 116-117.

Use of plastic coatings. (L26)

620-L. Black Chromium-Base Electroplating. Martin F. Quaely. *Plating,* v. 40, Sept. 1953, p. 982-985; disc., p. 985-986.

Process of electrodeposition. Table. 13 ref. (L17, Cr)

621-L. Crack-Free Chromium From Baths of the Self-Regulating High-Speed Type. R. Dow and J. E. Stareck. *Plating,* v. 40, Sept. 1953, p. 987-995; disc., p. 995-996.

Structure of deposit, resistance to thermal stress, corrosion, hardness, buffing, leveling action, plating speed, effect of tensile loading and fatigue. Micrographs, tables. (L17, Cr)

622-L. Cost Determination in the Industrial Chromium Plating Job Shop. William F. Walton and Pierre B. Lonsbury. *Plating,* v. 40, Sept. 1953, p. 1001-1004; disc., p. 1004.

Tank-hour rate system, extra charges, price determination and paper work. (L17, Cr)

623-L. Stability of Ion Exchange Resins Toward Chromic Acid Plating Solutions. C. F. Paulson and G. H. Saunders. *Plating,* v. 40, Sept. 1953, p. 1005-1008; disc., p. 1008-1009.

Use of resins in anodizing and electroplating plants. Tables, graphs. (L17, L19, Cr)

624-L. Porosity of Electrodeposited Metals. XI. Analysis of Corrosion Products as a Method of Measuring the Change of Porosity in Corrosion.

Plating, v. 40, Sept. 1953, p. 1011-1015.
Method by which the progress of corrosion can be determined as a function of time of exposure in objectively meaningful absolute units. Tables, graphs. (L17, R1, Fe, Ni)

625-L. Decomposition of Cyanides in Aqueous Solutions. W. R. Meyer, R. F. Muraca, and E. J. Serfass. *Plating*, v. 40, Oct. 1953, p. 1104-1109; disc., p. 1110.
Factors that cause decomposition. Data to evaluate magnitude of cyanide loss in plating solutions. Tables. (L17)

626-L. Evaluation of Carbonate Removal Methods. R. Scott Modjeska. *Plating*, v. 40, Oct. 1953, p. 1111-1114; disc., p. 1114.
Reviews and compares various methods for removal of carbonates from cyanide plating solutions. Table. 12 ref. (L17)

627-L. A Further Study on the Effect of Abrasive Metal Polishing on the Character of Nickel Plate. W. L. Pinner. *Plating*, v. 40, Oct. 1953, p. 1115-1118, 1123-1125; disc., p. 1125.
Surface imperfections in the base metal were shown to have a harmful effect on corrosion resistance and smoothness of Ni plated on steel. Micrographs, diagram. 2 ref. (L10, L17, Ni, CN)

628-L. Plating on Molybdenum. A. Korbelak. *Plating*, v. 40, Oct. 1953, p. 1126-1131; disc., p. 1131-1133.
Methods of plating various metals on Mo. Photographs, micrographs, tables. 11 ref. (L17, Mo)

629-L. Performance of Electrical Joints Utilizing New Silver Coating on Aluminum Conductors. T. J. Connor and W. R. Wilson. *Power Apparatus and Systems*, 1953, no. 7, Aug., p. 702-709; disc., p. 709-712.
Preparation and evaluation of Al joints which will meet standards of performance now being maintained in modern switchgear. Tables, graphs, photographs, diagrams. (L17, T1, Al, Ag)

630-L. The Formation of Hot Dipped Zinc Coatings. M. L. Hughes. *Product Finishing*, v. 6, Aug. 1953, p. 49-58.
Various factors affecting structure and properties of a galvanized coating. Micrographs. 22 ref. (L16, Zn)

631-L. Present Day Aircraft Finishes. R. H. Warring. *Product Finishing*, v. 6, Aug. 1953, p. 63-72, 116.
Appropriate specifications and ways of applying finishes for aircraft of all types. Tables, photographs. (L general, S22)

632-L. Priming and Pre-Treatment Advances. Degreasing Materials. *Product Finishing*, v. 6, Aug. 1953, p. 73-74.
Use of "Degresol" to remove grease, oil polishing rouge, and compo from surfaces of Al and Zn. Photograph. (L12, Zn, Al)

633-L. Copper Plating by Periodic Reverse Current. *Product Finishing*, v. 6, Aug. 1953, p. 80-84.
Processing details. Diagrams, photographs. (L17, Cu)

634-L. Tin Coatings Research. *Product Finishing*, v. 6, Aug. 1953, p. 89-91.
Sn-Ni and Sn-Zn plating, hot tinned coatings, and organotin compounds. Photographs. (L17, L16, Sn, Ni, Zn)

635-L. Automatic Plant for Electroplating. H. Silman. *Product Finishing*, v. 6, Sept. 1953, p. 48-60.
Advantages and disadvantages of automatic plants. Types of plants available and design considerations involved. Photographs. (L17, Cr, Ni)

636-L. Review of Degreasing Plant. *Product Finishing*, v. 6, Sept. 1953, p. 89-98.
British degreasing equipment and procedures. Photographs. (L12)

637-L. Antique Copper Finish for Modern Gas Ranges. Ezra A. Blount. *Products Finishing*, v. 17, Sept. 1953, p. 24-30, 32.
Plating Cu on steel range panels followed by a chemical treatment, spraying a clear enamel, and baking. Photographs. (L17, L26, Cu, CN)

638-L. How to Clean Zinc Base Die Castings Before Plating. A. T. Thibadeau. *Products Finishing*, v. 17, Sept. 1953, p. 68-70.
Procedure. (L12, Zn)

639-L. Practical Considerations Affecting the Fabrication and Mechanical Polishing of Stainless Steel Sheet. D. H. Lloyd. *Sheet Metal Industries*, v. 30, no. 317, Sept. 1953, p. 767-774, 784.
Mechanical properties, surface finish, heat treatment and finishing methods which necessitate modifications of normal techniques applied to mild steel. Graphs, photographs. (L10, G general, J general, SS)

640-L. The Electrochemical Manipulation of Stainless and High-Duty Alloys. P. A. Charlesworth and C. Hobson. *Sheet Metal Industries*, v. 30, no. 317, Sept. 1953, p. 825-832, 834, 837-838, 841.
Electropolishing process, plant re-

quirements and commercial applications. Photographs, micrographs. (L13, Cu, CN, SS, Ni, Cr)

641-L. Galvanizing With a Paint Brush. *Steel,* v. 133, Sept. 7, 1953, p. 158.

Protection given by 93 to 95% metallic zinc paints. (L16)

642-L. Vacuum Metallizing as a Production Process. J. Gordon Seiter. *Tool Engineer,* v. 31, Sept. 1953, p. 49-53.

Typical metallized parts, vacuum process, properties of coatings, typical production unit and advantages. Diagrams, photographs. (L25)

643-L. Process Controls Key to Top Quality Enamel Finishing on Rheem Wedgewood Range. Fred M. Burt. *Western Metals,* v. 11, Sept. 1953, p. 68-70.

Photographs, diagram. (L27)

644-L. Latest Line Processing Equipment Installed by Incandescent Heat Co. Ltd. *Wire Industry,* v. 20, Sept. 1953, p. 877-878, 880.

Continuous stand patenting, cleaning and coating line for handling simultaneously high-carbon steel rods and drawn wire. Continuous annealing, cleaning and galvanizing line for wire. Photographs. (L general, J23, J25, CN)

645-L. (Czechoslovakian.) **Protection of Steel From High Temperature Effects.** R. Kopec. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 411-414.

Alloying elements and diffusion coating with Al and Cr. Diagrams, photographs, micrographs, graphs. 4 ref. (L15, ST, Al, Cr)

646-L. (French.) **Hot Tinning.** G. Haas. *Métallurgie et la construction mecanique,* v. 85, no. 7, July 1953, p. 571-573.

Techniques in the use of fluxes. (To be continued.) (L16, Sn)

647-L. (French.) **Chemical Polishing of Aluminum and Its Alloys.** Jean Hérenguel. *Revue de l'Aluminium,* v. 30, no. 201, July-Aug. 1953, p. 261-267.

Process using H_2SO_4, H_3PO_4 and HNO_3 formulae. Metallographic and industrial applications. Photomicrographs. 9 ref. (L12, M general, T general, Al)

648-L. (German.) **Application and Economy of Metallic Coatings.** H. W. Dettner. *Metall,* v. 7, nos. 13-14, July 1953, p. 552-554.

Economic advantages of the various methods of preparing such coatings. 1 ref. (L general)

649-L. (German.) **Surface Erosion During Chemical and Anodic Polishing of Reflectal and Pure Aluminum.** L. Koch and S. Keste. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 577-581.

Polishing of Al and Al-Mg alloys. Chemical process was effective for pure Al, but $Al_{12}SiFe_3$ crystallites caused disturbance in 99% pure Al. Photographs, table. 4 ref. (L12, L13, Al)

650-L. (German.) **The Influence of Flame-Cleaning on the Properties of Steels.** H. Kemper and W. Pomaska. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 201-209.

Various gases, dusts and vapors in flame-cleaning. Effects of the cleaning on the corrosion resistance of steels. Tables, graphs, diagrams, photographs, photomicrographs. 12 ref. (L10, R general, ST)

651-L. (German.) **The Electrolytic Deposition of Elements at the Mercury Electrode.** Rudolf Bock and Karl-Gerhard Hackstein. *Zeitschrift für analytische Chemie,* v. 138, no. 5, May 1953, p. 339-357.

Tests on a number of elements, the effect of H_2SO_4 concentration upon the completeness of the deposition and some control experiments. Tables, graphs. 25 ref. (L17, Hg, Cu, Zn, Cd, In, Tl, Sn, Bi, Fe)

652-L. Coatings for Underground Pipelines. W. A. James. *Chemistry in Canada,* v. 5, Sept. 1953, p. 175-178.

Photographs, table. 13 ref. (L26, R8)

653-L. Plastics vs. Corrosion. *Modern Plastics,* v. 31, Sept. 1953, p. 83-89, 176-179.

Use of plastics in pipes, tubes, fittings, tanks and ducts. Welding technique, cold casting, coatings and linings. Photographs. (L26, K general)

654-L. (German.) **Protective Action of Cement Against Rust.** Hans Hebberling. *Werkstoffe und Korrosion,* v. 4, no. 7, July 1953, p. 247-248.

Action and preparation of effective cement coatings. 5 ref. (L26)

655-L. (Book.) **Electrodeposition Research.** Proceedings of the NBS Semicentennial Symposium on Electrodeposition Research Held at the NBS on Dec. 4-6, 1951, National Bureau of Standards Circular 529, 129 p. U. S. Government Printing Office, Washington 25, D. C. $1.50.

Papers cover research at various industrial, university and government laboratories in U. S. and Europe. (L17)

656-L. (Book—German.) **(Chemical and Galvanic Coatings. Surface Protection of Metals.) Chemische und Galvanische Uberzüge. Oberflächenschutz von Metallen.** H. Silman. 384

p. 1952. Verlag Chemie, G.m.p.h., Weinheim - Bergstrasse, Germany. 28.40 DM.

Condition and progress of the English and American electroplating industry in particular. (L general)

657-L. (Book—German.) **(Modern Electroplating.) Moderne Galvanotechnik.** Willy Machu. 560 p. 1953. Verlag Chemie, G.m.b.h., Weinheim-Bergstrasse, Germany. 40 DM.

Covers the whole field of electroplating. Chemical and mechanical pretreatment, grinding, polishing, degreasing, and pickling. (L general, L17)

658-L. A Dynamic Test for Detergency of Hard Surfaces. Manuel N. Fineman. *ASTM Bulletin,* 1953, no. 192, p. 49-55.

Test method to determine efficiency of detergents in cleaning wide variety of surfaces. Graphs, tables. 11 ref. (L12)

659-L. The Effect of Sheet Steel Quality on Vitreous Enamel Coatings. L. S. Heard. *Australasian Engineer,* 1953, Aug. 7, p. 43-47.

Results of tests on enamelled linings and sheet material. Micrographs, tables. (L27, CN)

660-L. Some Notes on the Microstructures of Enamelled Iron Castings. E. R. Evans. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 15-18.

Four microspecimens and reasons for occurrence of blisters. Micrographs, table. (L27, M27, CI)

661-L. The Relevance of Casting Skin to the Incidence of Blistering in Cast Iron Enamels. E. R. Evans. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Aug. 1953, p. 19-25.

Testing procedure, preparation of test pieces, processing plates and results. Tables, diagrams. (L27, CI)

662-L. Silicone Finishes for High Temperature Applications. R. C. Hedlund. *Finish,* v. 10, Oct. 1953, p. 45-46, 107-108.

Ability of silicone resins to resist heat and corrosion. Photographs. (L26)

663-L. The Painting of Steel. J. C. Hudson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 1, v. 29, 1953, 22 p.

Developments in protective painting; further research suggested. Graphs, micrographs, tables. 21 ref. (L26, ST)

664-L. Recent Development in Metal Spraying by the Powder Process. William McDermott. *Institute of Metal Finishing, Transactions, Advance Copy* no. 3, v. 29, 1953, 10 p.

Improved powder spraying pistol which permits application of denser, less oxidized and better adherent coatings of Tn, Al and other coating metals. Table, diagrams. (L23, Sn, Cu, Pb, Zn, Al, ST)

665-L. Recent Advances in Metal Spraying by the Wire Process. W. E. Ballard. *Institute of Metal Finishing, Transactions, Advance Copy* no. 4, v. 29, 1953, 8 p.

Trends of wire spraying industry during past five years. Photographs. 8 ref. (L23, Al, ST)

666-L. A Laboratory Study of a Commercial Method of Electroplating Aluminium. J. Edwards and C. J. Swanson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 5, v. 29, 1953, 11 p.

Laboratory-scale investigation of mechanism of electrolytic process for improvement and simplification. Tables. (L17, Al)

667-L. Complex Fluorides for the Deposition of Tin and Tin Alloys. A. E. Davies, R. M. Angles, and J. W. Cuthbertson. *Institute of Metal Finishing, Transactions, Advance Copy* no. 7, v. 29, 1953, 14 p.

Effects of addition agents, anode sludging and electrode efficiencies. Tables, graphs, micrograph. 11 ref. (L17, Sn)

668-L. Structural and Kinetic Phenomena Observed During the Anodic Polarization of Metals. H. R. Thirsk and W. F. K. Wynne-Jones. *Institute of Metal Finishing, Transactions, Advance Copy* no. 9, v. 29, 1953, 14 p.

Variety of methods useful in studying reactions at electrodes. Diagrams, micrographs, graphs. 19 ref. (L19, M26, Ni, Cu)

669-L. The Rate-Determining Stage in the Anodic Dissolution of Metals. A. Hickling and J. K. Higgins. *Institute of Metal Finishing, Transactions, Advance Copy* no. 10, v. 29, 1953, 18 p.

Experimental study, using potentiostat technique, of the limiting current densities of metal dissolution in electrolytic polishing solutions. Graphs, tables, diagram. 9 ref. (L13, Zn, Cu)

670-L. Bright Metal Surfaces and a Theory of Bright Plating. T. P. Hoar. *Institute of Metal Finishing, Transactions, Advance Copy* no. 11, v. 29, 1953, 8 p.

Several methods by which bright metal surfaces may be produced. Compares fundamental mechanisms of methods and shows how bright plating may be included in general plan. (L17, Ni, Co, Sn)

671-L. Economy in Metal Finishing. S. Wernick. *Institute of Metal Finishing, Transactions, Advance Copy* no. 12, v. 29, 1953, 8 p.

Ways of preventing increasing costs in metal finishing industry. Warns against danger of "short cuts". (L general, Zn, Al)

672-L. Effect of Chloride on the Deposition of Copper, in the Presence of Arsenic, Antimony, and Bismuth. V. Hospadaruk and C. A. Winkler. *Journal of Metals,* v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1375-1377.

Graphs and table. 6 ref. (L17, Cu, As, Sb, Bi)

673-L. Finishes for Aluminum. R. V. Vanden Berg. *Machine Design,* v. 25, Oct. 1953, p. 177-186.

Applications and processes. Photographs, graphs, table, diagram. (L general, Al)

674-L. Specification of Color in Finishes. Carl R. Smedley. *Machine Design,* v. 25, Oct. 1953, p. 187-192.

Pigments for use in organic and synthetic coatings. Photographs, table. (L26)

675-L. How to Descale Titanium. A. E. Durkin. *Materials & Methods,* v. 38, Oct. 1953, p. 107-109.

Molten caustic baths most practical method. Tables, graphs. 6 ref. (L12, Ti)

676-L. Sequestering Agents in Aluminum Etching. Francis J. Prescott, John K. Shaw, and Jay Lilker. *Metal Finishing,* v. 51, Oct. 1953, p. 65-67.

Use of gluconic acid resulted in a decrease in amount and adherence of scale. Photographs, table. 12 ref. (L12, Al)

677-L. Electroplating on Beryllium. John G. Beach and Charles L. Faust. *Metal Finishing,* v. 51, Oct. 1953, p. 68-70, 73.

Processes, adhesion testing and inspection methods. Diagram. 3 ref. (L17, Be)

678-L. Washing Dollars Out of Deburring. Gordon B. Ashmead. *Metal Finishing,* v. 51, Oct. 1953, p. 71-73.

Tumbling process. Photographs. (L10)

679-L. Priming Paints for Light Alloys. J. G. Rigg and E. W. Skerrey. *Metal Industry,* v. 83, Sept. 25, 1953, p. 259-261.

Tests carried out on a number of light alloys to determine relative resistance of four types of primary pigments to varying atmospheric conditions. (L26)

680-L. Powder Iron Parts Cadmium Plated. *Metal-Working,* v. 9, Oct. 1953, p. 12-13.

Plating of parts after impregnation with polyester resin. Photographs. (L26, H16, Fe, Cd)

681-L. Time Charts for Tumbling and Degreasing Mild Steel Parts. *Metal-Working,* v. 9, Oct. 1953, p. 26-27.

Tumbling and vapor degreasing. Graphs. (L10, L12, CN)

682-L. Abrasive Blasting Removes Flash From Die Cast Toys. *Precision Metal Molding* v. 11, Oct. 1953, p. 71-72.

Advantages of process. Photographs. (L10, Al, CN)

683-L. Spotlighting Finishing Progress. Sulfamate Nickel Plating. Sulfide-Cyanide Copper Stripping. C. Fred Gurnham. *Products Finishing,* v. 18, Oct. 1953, p. 54, 56, 58, 62, 64, 66, 68, 70, 74, 76, 78, 80, 82, 84.

Processes and their advantages over older methods. Photographs, graph. (L17, L12, Ni, Cu)

684-L. Cleaning Stainless Steel Work. II. E. M. Rains. *Sheet Metal Worker,* v. 44, Sept. 1953, p. 80-81, 141.

Cleaning of outdoor installations, place of chemical cleaners in difficult jobs, how to remove hard water-detergent film, eliminating stencils and grease pencil marks, and methods for cleaning industrial equipment. Photographs. (Concluded.) (L12, SS)

685-L. Coils Spin Through Rotary Pickler. *Steel,* v. 133, Sept. 28, 1953, p. 92, 94.

Principle and operation of high-speed pickler for cleaning and oiling. Diagrams, photographs. (L12)

686-L. Coating Takes on Life Saving Role. *Steel,* v. 133, Sept. 28, 1953, p. 90.

Use of Mo coating as a finish on metals. Photographs. (L15, Mo)

687-L. Gear Deburring. Brush Setup Matches Production Pace. William J. Maund. *Steel,* v. 133, Sept. 28, 1953, p. 120-122.

Equipment and operation of automatic deburring machine. Photographs, tables. (L10)

688-L. (French.) **Hot Tinning.** G. Haas. *Métallurgie et la construction mécanique,* v. 85, no. 8, Aug. 1953, p. 629-631.

Tinning baths and usual methods for tinning steel. (L16, ST)

689 L. (German.) **Fields of Application for Polishing Agents.** W. Hofmann. *Metalloberfläche,* Ausgabe B, v. 5, no. 8, Aug. 1953, p. 121-124.

Materials and working procedures. (L10)

690-L. (German.) **Adhesive Strength and Corrosion of Electroplated Aluminum.** F. Solar. *Metalloberfläche.*

Ausgabe B, v. 5, no. 8, Aug. 1953, p. 117-120.

Causes of poor bond between base and plating metals. Photographs, graphs, tables, diagram. (L17, R general, Al)

691-L. (German.) **Behavior of Anodes in Cyanide Baths.** W. Machu and A. M. Azzam. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug.-Sept. 1953, p. 298-307.

Mechanism of passivation of Cu in solutions of NaCN and Na-$Cu(CN)_2$ by anodic treatment. Increased concentration of the solutions retards passivation. Graphs, tables. 15 ref. (L17, R10, Cu)

692-L. Some Observations on the Preece Test and Stripping Tests for Zinc-Coated Wires. G. A. Ellinger, W. J. Pauli, and T. H. Orem. *American Society for Testing Materials, Preprint* no. 3s, 1953, 11 p.

Investigation to determine validity of the Preece test under varying conditions. Graphs. 7 ref. (L16, S14, Zn)

693-L. A Laboratory Evaluation of Ceramic Coatings for High Temperature Applications. Sara J. Ketcham. *American Society for Testing Materials, Preprint* no. 92c, 1953, 8 p.

Tests to determine resistance to thermal shock, protection against oxidation and adherence. Results of tests on coated 4130 steel. Micrographs, photographs. (L27, AY)

694-L. Tension Tests of Porcelain Enameled Steel. W. A. Deringer. *American Society for Testing Materials, Preprint* no. 92d, 5 p.

Tensile properties of glass or porcelain enamel coating on steel tension specimens studied to determine relationship between yield point of the steel and stress and strain required to cause the porcelain enamel coating to crack. Graphs. (L27, ST)

695-L. High-Temperature Ceramic Coatings as Applied to Aircraft Power Plants. B. L. Paris. *American Society for Testing Materials, Preprint* no. 92f, 1953, 8 p.

Expected benefits to be derived. Properties of these coatings and the position of the industrial engineer relative to the over-all program. Photographs, tables. (L27)

696-L. Theory and Practice of Chemical Polishing. I. Chemical Processes for Copper-Base Alloys. R. Pinner. *Electroplating and Metal Finishing,* v. 6, Oct. 1953, p. 360-367.

Chemical polishing compared to and contrasted with electro-polishing and mechanical polishing. Refers to an unpublished method for copper-based alloys and nickel with certain advantages over the Battelle process. Other new work. Table, graphs. (L12, L13, L10, Cu, Ni)

697-L. An Automatic Bright Dipping Plant. *Electroplating and Metal Finishing,* v. 6, Oct. 1953, p. 368-369.

Construction, operating sequence, transfer mechanism and solution control. Photographs. (L16)

698-L. Gas Plating—Its Possibilities in Industry. John E. Hyler. *Finish,* v. 10, Nov. 1953, p. 48, 56, 89.

Recent rapid plating process and its specific advantages. Photographs. (L general)

699-L. How We Prepare and Paint Metal Furniture. Robert J. Deisenroth. *Industrial Finishing,* v. 29, Oct. 1953, p. 30-31, 33-34, 36, 38.

Equipment, plant layout and operating procedures. Photographs. (L26)

700-L. A Porosity Test for Electrodeposits on Zinc-Base Die-Castings. H. K. Lutwak. *Institute of Metal Finishing, Bulletin,* v. 3, Summer 1953, p. 85-91.

New method using a solution of ammonium chloride and potassium ferrocyanide. 8 ref. (L17, Zn)

701-L. Roughness in Bright Nickel Electrodeposits. C. J. Swanson. *Institute of Metal Finishing, Bulletin,* v. 3, Summer, 1953, p. 91-112.

Causes of various types of surface defects. Photographs, tables. 6 ref. (L17, Ni)

702-L. Tin-Nickel Alloy Coatings—Estimation of Thickness and Porosity. S. C. Britton and D. G. Michael. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 143-162.

Electrolytic dissolution of tin-nickel alloy in phosphoric acid solution at 180° C. Porosity best determined by ferricyanide method. Photographs, graphs, tables. 7 ref. (L17, Sn, Ni)

703-L. Practical Aspect of the Plating of Aluminum Hollow-Ware. R. Ore. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 163-172.

Process for nickel and chromium plating on aluminum tea pots. Photographs, tables, diagrams. (L17, Al, Cr, Ni)

704-L. The Crystal Structure of Electrodeposited Tin Coatings on Iron Single Crystals. D. J. Evans. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 173-180.

Electron diffraction studies of tin on oriented iron crystals. Anomalies explained. Photographs, table, diagrams. (L17, M22, M26, Fe, Sn)

705-L. Rhodium Plating and Its Modern Appplications. E. H. Laister

and R. R. Benham. *Institute of Metal Finishing, Bulletin,* v. 3, Autumn, p. 181-203.

Plating with rhodium (sulfate process), and its advantages relative to resistance to heat and corrosion. Photograph, tables. (L17, Rh)

706-L. Fluoride v. Sulphate Hard Chrome Solutions. Which Offers Better Plating Properties? R. A. Balbiers and H. D. Burgess. *Iron Age,* v. 172, Oct. 22, 1953, p. 126-130.

Advantages of fluoride-catalyzed chrome plating solutions over standard sulfate baths. Graphs, tables. 7 ref. (L17, Cr)

707-L. Plating Gun Bores Gives Greater Accuracy and Longer Life. C. E. McDowell. *Machinery,* v. 60, Oct. 1953, p. 158-163.

Technique for hard chromium plating of tube bores for 90-mm. tank guns. Photographs. (L17, Cr)

708-L. Hot Dip Aluminising. M. L. Hughes and D. P. Moses. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 105-122.

Influence on properties of steel base, procedures and operation of a pilot plant for continuous coating and advantages and disadvantages of process. Tables, micrographs, macrographs. 29 ref. (L16, Al)

709-L. Electroplating in Lithography. G. N. Martin. *National Lithographer,* v. 60, Oct. 1953, p. 60-62.

Copper-chromium, copper stainless steel, and copper-aluminum plates; brush plating for correction and repair; and preparation of press rollers. (L17, Al, Cr, Cu, SS)

710-L. The Why and Wherefore of Automotive Finishing and Testing. Wardley D. McMaster. *Paint Manufacture,* v. 23, Oct. 1953, p. 325-332.

General finishing problems and testing procedures involved in developing a finish protective to metallic elements and pleasing in appearance. Photograph, tables, graphs. 10 ref. (L general)

711-L. Electrostatic Paint Spraying. Richard Tilney. *Paint Manufacture,* v. 23, Oct. 1953, p. 335-336.

Development of techniques to atomize the coating material and to deposit it on the workpiece. Photograph, diagram. (L26)

712-L. The Uniformity of Galvanized Coatings and the Expected Life of the Galvanized Article. N. B. Rutherford. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 891-898.

Withdrawal conditions were much more important than presence or absence of small aluminum content in producing uniform coatings. A modified practice made possible a reduction in zinc consumption without affecting expected life of galvanized ware. Diagrams, tables. 9 ref. (L16)

713-L. The Strains in Vitreous Enamels Fired on Metals. H. Moore. *Sheet Metal Industries,* v. 30, no. 318, Oct. 1953, p. 909-914.

Effects of differences between expansion coefficients of enamel coating and metal. Tables, diagram. (L27)

714-L. Aluminum Electrodeposits Made Adherent. W. C. Schickner. *Steel,* v. 133, Nov. 2, 1953, p. 125.

Method of dipping metal to be plated in fatty acid solution to give strong bond with base. Photographs. 2 ref. (L17, Al)

715-L. Phosphate Coating; Extra Step Is Shortcut to Quality Finishes. *Steel,* v. 133, Oct. 26, 1953, p. 158-159.

Porous buffer zone which holds organic finishes prevents rusting or confines it to exposed surfaces; and provides cushion that is flexible enough to resist impact and bending. Photographs, tables. (L14)

716-L. Finishes for Metals. I. Cleaning and Surface Preparation. Robert A. Wason. *Tool Engineer,* v. 31, Nov. 1953, p. 69-78.

Necessity of adequate preparation of metal for finishing and methods of mechanical, temperature and chemical cleaning. Photographs. (To be continued.) (L10, L12)

717-L. Animal Fats in Hot Dip Tinning. E. G. Fochtman, L. C. Kinney, G. G. Ference, R. W. Riemenschneider, S. G. Morris and W. C. Ault. *U. S. Dept. of Agriculture, Bureau of Agriculture and Industrial Chemistry, AIC* 354, 1953, 14 p.

Better grades of greases and tallows with appropriate processing perform as well or better than palm oil. Cost of processing is not prohibitive and price of the finished oil is favorable compared to average prices of palm oil. Tables. (L16)

718-L. (English.) Electrolytic Polishing of Special Steel and Alloys. *Aciers Fins and Speciaux Francais,* 1953, no. 14, July, p. 32-37.

Potentialities for industrial use and properties of finished surfaces. Photographs. (L13, ST, AY)

719-L. (French.) On the Mechanism of Electrolytic Polishing. Eugene Darmois and Israel Epelboin. *Comptes rendus,* v. 237, no. 10, Sept. 7, 1953, p. 503-504.

Process explained by the passage of chlorate ions by adsorption to the surface to be polished. The layer formed contains sufficiently inten-

sive electric field to cause the metal ions to pass directly into the solution. 6 ref.
(L13, Na, Mg, Al, Fe, Ni, Cu, Pb, Hg)

720-L. (French.) **Practical and Comparative Study of Some Processes for the Preparation of Cast Metal Before Electrolytic Coating, or Coating by Immersion in Molten Metals.** G. Lerouge. *Metaux, Corrosion-Industries,* v. 28, no. 337, Sept. 1953, p. 348-369.

Tests with nickel, chromium and tin coatings on various types of castings. Micrographs, tables, diagrams. 12 ref.
(L10, L12, L13, Ni, Cr, Sn)

721-L. (French.) **Defects of Alumina Films in Relation to the Structure of Aluminum and Its Alloys.** P. Bussy. *Revue de Métallurgie,* v. 50, no. 9, Sept. 1953, p. 629-634.

Electron microscopic studies of thin alumina films obtained by anodic oxidation. Effects of additions and the rate of cooling upon the structure. Micrographs. 11 ref.
(L19, M21, Al)

722-L. (German.) **Equipment for Testing Anodic Coatings. II.** *Aluminium Ranshofen Mitteilungen,* 1953, no. 2, July. p. 34-35.

Thickness and quality of anodic film can be determined by measuring dielectric strength of aluminum. Graph. (L19, S14, Al)

723-L. (German.) **Advances in Phosphating.** H. Keller. *Metalloberfläche,* Ausgabe A, v. 7, no. 9, Sept. 1953, p. 129-136.

Surface treatment by phosphating and similar processes. Emphasizes rapid advances being made and economic aspects. Photographs, graphs, diagram. 6 refs. (L14)

724-L. (German.) **Stripping Electroplated Coatings by Chemical Processes.** Richard Erdmann. *Metalloberfläche,* Ausgabe B, v. 5, no. 9, Sept. 1953, p. 141-142.

Processes for removing coats of nickel, silver, gold, copper, zinc, cadmium, chromium, tin and brass.
(L12, Ni, Ag, Au, Cu, Zn, Cd, Cr, Sn)

725-L. Abrasive Shot Cuts Sheet, Strip Cleaning Costs. Gilbert D. Dill. *Iron Age,* v. 172, Oct. 29, 1953, p. 91-93.

Equipment, technique and advantages over pickling process.
(L10, ST)

726-L. Flux Supplies Alloy for Hard Surfacing Manipulators. Fred H. Knibbs, *Iron Age,* v. 172, Oct. 29, 1953, p. 98-99.

New technique in use on mild steel in which alloy content of deposited metal is supplied by flux rather than electrode wire. Photographs, tables. (L24, ST)

727-L. Recent Developments in the Plating of Aluminium. *Light Metals,* v. 16, Oct. 1953, p. 344-346.

Electrolytic zincate dip pretreatment and copper flash process prior to subsequent plating with nickel or chromium. Direct plating techniques and corrosion resistance of finishes. Tables. 29 ref.
(L17, Al, Cu, Ni)

728-L. Black Chromium-Base Electroplating. M. F. Quaely. *Metal Industry,* v. 83, Oct. 9, 1953, p. 299-300.

Methods tried before a satisfactory solution was obtained. Indicates three methods by which an adherent black coating can be obtained. 6 ref. (L17, Cr)

729-L. Relative Importance of Various Sources of Defect-Producing Hydrogen Introduced Into Steel During Application of Vitreous Coatings. Dwight G. Moore, Mary A. Mason and William N. Harrison. *U. S. National Advisory Committee for Aeronautics, Report* 1120, 1953, 12 p.

Results show that dissolved water in the frit is the principal source of hydrogen. In normal enameling operations chemically combined water in the clay, milling water, quenching water and acid pickling are minor sources of hydrogen. Tables, graphs, micrographs, diagram.
(L27, CN)

730-L. (French.) **Practical and Comparative Study of Several Processes in the Preparation of the Casting Before Coating by Electrolysis or by Immersion in Molten Metals.** G. Lerouge, *Metaux, Corrosion-Industries,* v. 28, nos. 335-336, July-Aug. 1953, p. 302-318.

Attempts to eliminate foundry "skin" and graphite carbon. Deposits effected on differently prepared metals. Tables, micrographs, diagrams. (To be continued.)
(L17, L16, E25, CI)

731-L. (German.) **Problems and Testing of Paints and Lacquers on Light Metals.** W. Toeldte. *Aluminium,* v. 29, no. 10, Oct. 1953, p. 413-416.

Various problems in application and testing. 4 ref.
(L26, R general, EG-a)

732-L. (German.) **Questions Regarding the Painting of Metals.** Heinz Anders. *Metalloberfläche,* Ausgabe A, v. 7, no. 9, Sept. 1953, p. 139-141.

Organic coatings used to impart high-impact strength to metals. 10 ref. (L26)

733-L. (German.) **Special Chromium Plating Equipment.** *Metalloberfläche,*

Ausgabe A, v. 7, no. 10, Oct. 1953, p. 152-157.

Equipment for plating large quantities of small and special parts. Photographs. (L17, Cr)

734-L. (German.) **Copper Baths for the Formation of Heavier Intermediate Layers for Subsequent High-Luster Nickel and Chromium Platings.** Erich Gerber. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953, p. 152-153.

Advises use of proper cyanide-copper baths. (L17, Ni, Cr, Cu)

735-L. (German.) **The Adhesive Strength of Nickel-Chromium Deposits.** Arvid v. Krustenstjern. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953 p. 153-154.

Thorough cleaning was shown to be necessary for good adherence. Photographs, table. (L17, Ni, Cr)

736-L. (German.) **D-Chromium Plating.** Artur Kutzelnigg. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953. p. 156-160.

Special uses on different metals. Photographs, micrographs. 6 ref. (L17, Cr)

737-L. (German.) **Recent Developments in Chromium Deposition.** Heinz W. Dettner. *Metalloberfläche,* Ausgabe B, v. 5, no. 10, Oct. 1953, p. 149-151.

Reviews recent literature on improved methods. Graphs. 23 ref. (L17, Cr)

738-L. (German.) **Removing Chromium, Especially Hard Chromium.** A. Pollack. *Metalloberfläche,* Ausgabe A, v. 7, no. 10, Oct. 1953, p. 157-158.

Electrolytic removal of chromium with and without nickel base. 5 ref. (L17, Cr, Ni)

739-L. (Russian.) **Removal of Scale With Sodium Hydride.** A. V. Smirnov, S. A. Semenkovich, and F. A. Bogachev. *Vestnik Mashinostroeniia,* v. 33, no. 3, March 1953, p. 37-39.

Process reducing metal losses for any composition and structure of scale. Diagram, table. (L12)

740-L. (Book.) **Enamel Bibliography and Abstracts.** Roger L. Fellows, compiler. 487 p. 1953. American Ceramic Society, 2525 N. High Street, Columbus 2, Ohio.

A compilation of all published material from 1940 to 1949. Includes abstracts on porcelain enameling and references pertaining to refractory coatings for metals. (L27)

741-L. (Book—German.) **(Hard Chromium) Hartchrom.** Heinrich Arend, Heinz W. Dettner. 1952. 183 p. Verlag W. Girardet, Essen, Germany. 19.60 DM.

Process of hard chromium deposition. Photographs, diagrams, tables. (L17, Cr)

742-L. (Book—German.) **(Flame Spraying of Steel, Metals, and Plastics) Flammspritzen von Stahl, Metallen, und Kunststoffen.** J. C. Fritz. 1953. 138 p. Verlag W. Girardet, Essen, Germany, 16.80 DM.

Properties and testing of sprayed coatings. Equipment, methods of spraying, preparation of surface, and costs. Photographs, diagrams, tables. (L23)

SECTION M

METALLOGRAPHY, CONSTITUTION and PRIMARY STRUCTURES

1-M. The Structure and Properties of Magnetic Alloys. D. W. Davison. *Australasian Engineer,* Sept. 8, 1952, p. 44-49.

Both main classes of ferromagnetic materials are discussed, namely, "hard" alloys for permanent magnets and "soft" alloys for coil cores. Deals particularly with atomic arrangements found in these alloys. Diagrams of lattice geometry are included for most of the structures and various magnetic properties are tabulated, alloy names being entered in descending order against a vertical scale of selected magnetic quantity. (M27, P17, SG-n, p)

2-M. Free Iron in Brass Ingot. *Metal Industry,* v. 81, Nov. 7, 1952, p. 364.

Determination by micro-examination, chemical analysis, and magnetic separation. (M27, S11, Cu)

3-M. Application of Fluorescence X-Rays to Metallurgical Microradiography. H. R. Splettstosser and H. E. Seemann. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1217-1222.

Shows that fluorescence X-rays may be more useful analytically in metallurgical microradiography than line emission from a tube target because of greater homogeneity of the former radiation. Although intensity of fluorescence is low, exposure times are not prohibitive for some applications. Method and apparatus and illustrative examples are shown. Microradiographs. (M23)

4-M. An X-Ray Diffraction Study of the Hafnium-Hydrogen System. S. S. Sidhu and J. C. McGuire. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1257-1260.

Limit of solid solubility of H_2 in Hf, number of Hf-H phases formed and their crystalline structures. Diagrams, graphs, tables, and micrographs. (M24, Hf)

5-M. The Gold-Platinum System. A. S. Darling, R. A. Mintern, and J. C. Chaston. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 125-132.

Results of a re-investigation of equilibrium diagram of the Au-Pt system confirming a continuous series of solid solutions below the solidus. Transformations in the solid state below 1000° C. were not studied. Diagrams and charts. (M24, Au, Pt)

6-M. Direct Examination of Solid Surfaces Using a Commercial Electron Microscope in Reflection. J. W. Menter. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 163-167.

Modifications necessary for conversion of Metropolitan Vickers EM3 electron microscope for use in direct examination of solid surfaces by reflection. Diagrams and micrographs. 14 ref. (M21)

7-M. A Thermal and Microscopic Study of the Iron-Carbon-Silicon-System. J. E. Hilliard and W. S. Owen. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 268-282.

Constant-Si sections of the metastable Fe-C-Si diagram at 2.3%, 3.5%, 5.2%, and 7.9% Si were determined by thermal analysis and microscopic study of vacuum-melted high-purity alloys. Projections on two binary sides and four isothermal sections of the system are reproduced. Diagrams, tables, and micrographs. 28 ref. (M24, Fe, AY)

8-M. Nature of the Line Markings in Titanium and Alpha Titanium Alloys. C. M. Craighead, G. A. Lenning, and R. I. Jaffee. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1317-1319.

Nature of the fine line markings which appear in the microstructures of unalloyed Ti. Typical examples

variously called x phase, etching pits, and twins are shown. (M27, Ti)

9-M. Modifications of an X-Ray Method for the Measurement of Retained Austenite Concentrations in Hardened Steels. Karl E. Beu. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1327-1328.

Several modifications which reduce time and increase accuracy. Typical results. (M23, ST)

10-M. Structure and Crystallography of Second Order Twins in Copper. M. Sharp and C. G. Dunn. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1344.

Formation of twins and second-order twins in cubic metals. Examples of the latter. (M27, Cu)

11-M. The ABC of Titanium Alloys. Walter L. Finlay. *Metal Progress,* v. 62, Nov. 1952, p. 73-78.

α, β, and α-β phases are used to explain the general features of Ti-base alloys. Data on mechanical properties, crystal structures, forming characteristics, and equilibrium diagrams. (M26, Q general, Ti)

12-M. Colour Etching of Iron and Steel. Various Etchants to Reveal Physical and Chemical Heterogeneities. L. Beaujard. *Metal Treatment and Drop Forging,* v. 19, Nov. 1952, p. 499-503.

Use of caustic-soda solutions with oxidizing agents to reveal chemical and physical heterogeneities of steel specimens. Diagrams and photomicrographs. (M21, ST, Fe)

13-M. Screw Dislocations, Etch Figures, and Holes. F. Hubbard Horn. *Philosophical Magazine,* ser. 7, v. 43, Nov. 1952, p. 1210-1213.

Etch figures similar in appearance to those observed in mineralogical technique are shown to result from rapid chemical dissolution of growth spirals on silicon carbide. Shows that prolonged rapid dissolution of a crystal with a screw dislocation extending between opposite crystal faces results in a hole through the crystal at the site of the screw dislocation. Micrographs. (M26, Si)

14-M. An Effect of Electron Bombardment on Order in Cu_3Au Alloy. J. Adam, A. Green, and R. A. Dugdale. *Philosophical Magazine,* ser. 7, v. 43, Nov. 1952, p. 1216-1218.

Experiment designed to study part played by lattice defects introduced by high-energy electron bombardment. (M26, Cu, Au)

15-M. Methods in Electron Microscopy of Solids. R. D. Heidenreich. *Review of Scientific Instruments,* v. 23, Nov. 1952, p. 583-594.

Methods of replicating solid surfaces for electron microscopy are reviewed and compared. Preparation of metal surfaces for electron microscopy, and advantages of employing electron diffraction techniques in evaluating prepared surfaces. Examples of application of replicas include steel, precipitation in alloys, such as Alnico 5, and studies of slip in Al. Use of thin metal sections and of emission electron microscopy in studying metallic structures. Micrographs. 24 ref. (M21, ST, SG-n)

16-M. (English.) **Aluminium Monochromator With Double Curvature for High-Intensity X-Ray Powder Photographs.** G. Hägg and N. Karlsson. *Acta Crystallographica,* v. 5, Nov. 10, 1952, p. 728-730.

Construction and performance of above monochromator in which the point-focus is used for taking powder photographs of the Guinier type. (M22, Al)

17-M. (English.) **An X-Ray Powder Study of β-Uranium.** J. Thewlis. *Acta Crystallographica,* v. 5, Nov. 10, 1952, p. 790-794.

Description of the powder pattern of β-Uranium and the Debye characteristic temperature and thermal expansion coefficients of β-Uranium and UO_2. Graphs and tables. (M22, P11, U)

18-M. (English.) **The Crystallographic Relationship Between the Phases γ and ε in the System Iron-Manganese.** J. Gordon Parr. *Acta Crystallographica,* v. 5, Nov. 10, 1952, p. 842-843.

Brief description. Micrographs. (M24, Fe, Mn)

19-M. (Russian.) **Anisotropic Distortion of the Crystalline Lattice of Martensite.** V. A. Il'ina, V. K. Kritskaia, and G. V. Kurdiumov. *Doklady Akademii Nauk SSSR,* v. 85, Aug. 11, 1952, p. 997-999.

1.3% C steel was used for X-ray diffraction studies of lattice distortion. (M22, CN)

20-M. The Chromium Corrosion and Heat Resisting Steels. H. R. Dalziel. *Australasian Engineer,* Oct. 7, 1952, p. 52-57.

Constitution of high-Cr steels, heat treatment of high-Cr steels, Fe-Cr-C ternary system, effect of other alloying elements, and typical steels and their uses. Diagrams and tables.
(M24, J general, SS, SG-g, h)

21-M. Ferrite in Austenitic Steels Estimated Accurately. T. V. Simpkin-

son. *Iron Age,* v. 170, Dec. 11, 1952, p. 166-169.

Calibration curves which simplify estimation of ferrite in cast and wrought steel products with the Aminco-Brenner Magne-Gage using carbonyl and electrolytic iron powders in bakelite compacts. Charts and photomicrographs. (M23, Fe, SS)

22-M. Liquidus Surface of the Fe-S-O System. D. C. Hilty and Walter Crafts. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1307-1312.

The liquidus diagram for the iron field of the Fe-S-O system was derived experimentally. The solubility of oxygen in molten Fe-S alloys was measured at several temperatures and found first to decrease slightly and then increase rapidly with increasing sulphur content. Diagrams, tables, and micrographs. (M24, Fe)

23-M. Electron Microscopy of Solid Surfaces. V. E. Cosslett. *Nature,* v. 170, Nov. 22, 1952, p. 861-863.

Instrument for making micrographs of steel, Al, Ni-plated brass and Zn without replicas. (M21, ST, Al, Cu, Zn)

24-M. Microconstituents in Chromium-Base Chromium-Iron-Molybdenum Alloys and Their Behavior With Heat Treatment. Joseph P. Hammond, Arthur B. Westerman and Howard C. Cross. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1329-1342.

Phases in Cr-Fe-Mo alloys were investigated with homogenization, aging temperature, composition range, and alloy addition as variables. Metallography, three X-ray methods, and hardness were used as methods of study. Composition range of 60% Cr, 15-25% Fe, 15-25% Mo, 0.005-0.36% C with aging at 1400-2000° F. was investigated. With 2% Ti, TiC and TiN are formed; with nitrogen Cr_2N. Tables and micrographs. 10 ref. (M27, J general, Cr)

25-M. (Book.) **Metallurgical Equilibrium Diagrams.** W. Hume-Rothery, J. W. Christian, and W. B. Pearson. 311 pages. 1952. The Institute of Physics, 47 Belgrade Sq., London S.W.1, England. 50s.

A general discussion of known experimental methods, with detailed description of apparatus used in each case and the principles on which it operates; determination of freezing point curve or liquidus; determination of melting point curve or solidus; and determination of boundaries between crystals, defined by temperature and composition, and between constituents of an alloy in solid or semi-solid state. (M24)

26-M. (Book—German.) **(Outline of General Metallography.) Grundriss der allgemeinen Metallkunde.** E. Brandenberger. 333 pages. 1952. Ernst Reinhardt Verlag, Basel, Switzerland. Paperbound, 14; Clothbound, 16.50 Swiss francs.

Concerned with a general discussion of principles underlying metallography of both ferrous and nonferrous metals. Divided into 5 sections; metallography of pure metals, substitutional solid solutions, intermediate phases and intermetallic compounds, and chemical reactions of metals with solid, liquid, and gaseous phases. (M general, N general)

27-M. (Book.) **The Phase Rule and Its Applications. Ed. 9.** Alexander Findlay. Revised and enlarged by A. N. Campbell and N. O. Smith. 494 pages. 1951. Dover Publications, Inc., 1780 Broadway, New York 19, N. Y. Paperbound, $1.90; Clothbound, $5.00.

Provides a clear exposition of general principles of all types of equilibrium relationships that can be represented in phase diagrams. (M24, N6)

28-M. (Book — Russian.) **Structural Crystallography.** N. V. Belov. 88 pages. Academy of Sciences of the U.S.S.R., Publishing House, Moscow. 4 rubles.

Consists of four lectures for postgraduate students designed to explain nature and properties of the space lattice. (M26)

29-M. Grain Size. Key to Mechanical Properties. H. A. Unckel. *Iron Age,* v. 170, Dec. 18, 1952, p. 148-152.

Mechanical properties of metals and alloys show a marked rise or fall with changes in grain size. Tensile strength, yield point, hardness, and reduction of area show varying degrees of change and differences in Al, Cu, and brass due to combined effects of orientation and porosity concentration along crystal boundaries. Tables, micrographs, and photographs. 10 ref. (M27, Q general, Al, Cu)

30-M. The Total Neutron Cross-Sections of Cobalt, Silver, Iodine, Aluminium, Nickel, and Gallium Between 1 eV and 5 keV. A. W. Merrison and E. R. Wiblin. *Proceedings of the Royal Society,* ser. A, v. 215, Nov. 25, 1952, p. 278-289.

Experimental results of total neutron cross-section measurements made with a neutron time of flight

spectrometer at the Atomic Energy Research Establishment, Harwell. Ag, Co, I, Al, Ni, and Ga were studied. Results are presented as curves showing the variation of total cross-section with neutron energy. Graphs. (M25, Co, Ag, Al, Ni, Ga)

31-M. Crystal Structure and Antiferromagnetism in Haematite. B. T. M. Willis and H. P. Rooksby. *Proceedings of the Physical Society,* sec. B, v. 65, Dec. 1, 1952, p. 950-954.

Investigated by X-ray analysis in the range 20-950° C. Results are interpreted in terms of an antiferromagnetic behavior of pure hematite, with a Curie point at approximately 675° C. The behavior is analogous to that of cubic oxides FeO and Fe_3O_4, which exhibit structure cell deformations on cooling through certain critical temperatures. Graphs. 11 ref. (M26, P16, Fe)

32-M. Two Powder Metallurgical Methods to Prepare Alloy Specimens on a Laboratory Scale. Jacob Schram. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 682-694.

Two methods of preparing alloys from powders; by mixing and by impregnating a sintered compact. Fe-Zn alloys were used in the experiments. (M21, H general, Fe, Zn)

33-M. Phase Changes Associated With Sigma Formation in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel. K. W. J. Bowen and T. P. Hoar. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 695-706.

A study was made using metallographic, magnetic, and density measurements. Tables, charts, and micrographs. 13 ref. (M24, SS)

34-M. Electrolytic Polishing of Zirconium, Titanium, and Beryllium. P. A. Jacquet. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 732-751.

Techniques, solutions, advantages and disadvantages. Micrographs. 20 ref. (M21, Zr, Ti, Be)

35-M. Neutron Diffraction Studies of Cold-Worked Brass. R. J. Weiss, J. R. Clark, L. Corliss, and J. Hastings. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1379-1382.

Background, integrated intensities, extinction effects, and nature of line broadening. 15 ref. (M22, Cu)

36-M. Mechanism of Growth of Whiskers on Cadmium. Milton O. Peach. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1401-1403.

Qualitative explanation for cause and mechanism of growth of whiskers observed on Cd and Sn. Diagrams. (M26, Cd, Sn)

37-M. Equilibrium Relations at 460° C. in Aluminium-Rich Alloys Containing 0-7% Copper, 0-7% Magnesium, and 1.2% Silicon. H. J. Axon. *Journal of the Institute of Metals,* v. 20, Dec. 1952, p. 209-213.

Phases encountered are Al-rich solid solution, $CuAl_2$, Mg_2Si, Si, ternary phase Al_2CuMg, and a quaternary phase which probably has composition $Al_5Cu_2Mg_8Si_6$. These phases give rise to 14 separate phase fields. A new 460° C. isothermal for Al rich region of Al-Cu-Si system is also given. 16 ref. (M24, Al, Cu, Mg, Si)

38-M. The Sub-Grain Structure in Aluminium Deformed at Elevated Temperatures. J. A. Ramsey. *Journal of the Institute of Metals,* v. 20, Dec. 1952, p. 215-216.

Structures in coarse-grained Al deformed at high temperatures were found to resemble structures resulting from room temperature deformation followed by heating. (M27, Q24, Al)

39-M. Microscopical Examination of Samples of Iron Containing Aluminous Inclusions. R. E. Lismer and F. B. Pickering. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 381-383.

To establish optical and chemical properties of inclusions, specimens were examined under normal vertical illumination, under polarized light, after application of Whiteley's test, and after acid tests. Table and micrographs. (M27, Fe)

40-M. Autoradiography of Metal Surfaces Using a Radiochemical Method. E. Rabinowicz. *Nature,* v. 170, Dec. 13, 1952, p. 1029-1030. (M23, Cu)

41-M. (German.) **Structure of the Copper-Silver-Indium System. II. Process of Equilibrium up to an Indium Content of 30%.** Erich Gebhardt and Manfrid Dreher. *Zeitschrift für Metallkunde,* v. 43, Oct. 1952, p. 357-363.

Results of thermal, microscopic and radiographic investigations, as well as electric conductivity. Equilibrium diagrams with In contents of 10, 20, 25, and 30% are plotted. Tables, diagrams, micrographs. (M24, Cu, Ag, In)

42-M. A Replica Method for Study of the Structure of Lead-Antimony Alloys. Jeanne Burbank. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 55-56.

Technique developed for microscopic study of 3-dimensional structure of Pb-Sb alloys by formation of a chemical replica in which internal structure of metal may be seen directly. Micrographs. (M21, Pb, Sb)

43-M. Effect of Alloying Elements on the Behavior of Nitrogen in Alpha Iron. L. J. Dijkstra and R. J. Sladek. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 69-72.

Theory and recent work on effects of Mn, Cr, Mo, and V on internal friction and elastic recovery. Changes in atomic structure. Graphs. 9 ref. (M25, Q21, Q22, Fe, Cr, Mo, V)

44-M. Systems Zirconium-Molybdenum and Zirconium-Wolfram. R. F. Domagala, D. J. McPherson, and M. Hansen. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 73-79.

On basis of metallographic analysis, incipient melting data, thermal analysis work, and X-ray diffraction, phase relationships in 0-50 atomic % alloy content were carefully resolved. Phase relationships in higher alloy content regions were outlined and a single intermediate phase, peritectically formed, of form ZrX_2 was established in each system. Tables, graphs, and micrographs. 6 ref. (M24, Zr, Mo, W)

45-M. Measurement of Internal Boundaries in Three-Dimensional Structures by Random Sectioning. Cyril Stanley Smith and Lester Guttman. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 81-87.

It is shown, from a study of geometric probabilities, that average number of intercepts per unit length of a random line drawn through a 3-dimensional structure is exactly half true ratio of surface to volume. Metric relations are tabulated that may be of use in studies of microstructure of polycrystalline, cellular, or particulate matter generally. Diagrams and tables. 11 ref. (M27)

46-M. Uniformly Moving Dislocations in Anisotropic Media. A. W. Saenz. *Journal of Rational Mechanics and Analysis,* v. 2, Jan. 1953, p. 83-98.

Mathematical interpretation. 25 ref. (M26)

47-M. Correlation Between Electron and Optical Microscopical Examination of Metal Surfaces. E. C. W. Perryman and Sheila Vernon-Smith. *Journal of the Royal Microscopical Society,* v. 72, Nov. 1952, p. 99-101.

Examples are given of correlation between images of metallurgical preparations as observed in light microscope, with and without phase contrast, and in the electron microscope. These illustrate difficulties of unambiguous interpretation and show need for a more critical, preferably comparative, approach in metallurgical microscopy. Cu was used in the experiments. Micrographs. (M21, Cu)

48-M. Some Observations on the Structure of Spheroidal Graphite in Nodular Cast Irons. M. N. Parthasarathi, B. S. Srikantiah, and B. R. Nijhawan. *Journal of Scientific & Industrial Research,* v. 11A, Nov. 1952. p. 501-504.

Brief discussion. Micrographs. 7 ref. (M27, CI)

49-M. The Effect of Structure on Machining Characteristics of Steel. V. H. Erickson. *Metal Treating,* v. 3, Nov.-Dec. 1952, p. 6-7, 23.

General discussion. (M27, G17, ST)

50-M. Growth Spirals Originating From Screw Dislocations on Electrolytically Produced Titanium Crystals. M. A. Steinberg. *Nature,* v. 170, Dec. 27, 1952, p. 1119-1120.

Briefly describes investigation. Micrographs. 6 ref. (M26, Ti)

51-M. Crystal Distortion of Graphite in Cast Irons. Eitaro Matuyama. *Nature,* v. 170, Dec. 27, 1952, p. 1123-1124.

Briefly describes investigation. Graphs. (M26, CI)

52-M. Surface Impregnation of Steel With Tungsten From a Gaseous Medium. G. N. Dubinin. Henry Brutcher Translation 2941, 9 pages.

Previously abstracted from original in *Doklady Akademii Nauk SSSR.* See item 407-M, 1952. (M24, N1, W, ST)

53-M. (German.) **Investigations Into the Ternary Systems Mg-Cu-Zn, Mg-Ni-Zn, and Mg-Cu-Ni.** Karl Heinz Lieser and Helmut Witte. *Zeitschrift für Metallkunde,* v. 43, Nov. 1952, p. 396-401.

Thermal, X-ray, and microscopic investigations were carried out to explain existence of the quasi-binary systems. Tables, graphs, and micrographs. 17 ref. (M24, Mg, Cu, Zn, Ni)

54-M. (Book-German.) **(Ternary Aluminum Alloys) Ternäre Legierungen des Aluminiums.** Heinrich Hanemann and Angelica Schrader. 170 pages plus 502 photomicrographs. 1952. Verlag Stahleisen G.m.b.H. Düsseldorf, Germany.

Metallographic phenomena and metallographic techniques. Includes phase diagrams and tabulated data. 223 ref. (M21, M24, M27, Al)

55-M. (Book.) **X-Ray Crystallographic Technology.** Andre Guinier. (Translated from the French by T. L. Tippell) 330 pages. 1952. Hilger and Watts Ltd., 98 St. Pancras Way, Camden Rd., London, N.W.1, England. 56s. Obtainable in U. S. from Jarrell-Ash Co., 165 Newberry St., Boston 16, Mass. $9.50.

The general properties of X-rays, elements of crystallography and of diffraction theory. The different problems amenable to X-ray crystallography, and some more difficult questions, such as the influence of crystalline imperfections, diffraction by amorphous bodies, and small particle scattering. (M22, M26)

56-M. A Simple Goniometric Method for Examining Preferred Orientation in Etched Metal Polycrystals. Pamela Dunsmuir. *British Journal of Applied Physics,* v. 4, Jan. 1953, p. 27-29.

Simple apparatus for determining orientation of etched metal crystals. Multi-colored light source enables rapid determination of preferred orientation in polycrystals. Tungsten was used in experiments. (M23, W)

57-M. Metal-Hydrogen Systems. III. The Uranium - Hydrogen System. Thomas R. P. Gibb, Jr., James J. McSharry, and Henry W. Kruschwitz, Jr. *Journal of the American Chemical Society,* v. 74, Dec. 20, 1952, p. 6203-6207.

Experimental data and results. Graphs and tables. (M24, N1, U)

58-M. A Method of Determining Orientations in Aluminium Single Crystals and Polycrystalline Aggregates. G. E. G. Tucker and P. C. Murphy. *Journal of the Institute of Metals,* v. 81, Jan. 1953, p. 235-244.

Method for construction of (100) pole figures from angular measurements of etch-pits that are developed in micrographically prepared commercial and super-purity Al. Suitable etching reagents, and technique of angular measurement using a metallurgical microscope. Micrographs. (M23, Al)

59-M Regarding Sigma Phase Formation. David S. Bloom and Nicholas J. Grant. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 88.

Sigma phase formation of the first transition group metals. Suggests future studies using Mn as base element.
(M27, V, Cr, Mn, Fe, Co, Ni)

60-M. A Theory of the Deviation From Close Packing in Hexagonal Metal Crystals. John B. Goodenough. *Physical Review,* ser. 2, v. 89, Jan. 1, 1953, p. 282-294.

A mechanism is proposed to show how Fermi surface interacts with Brillouin zone boundaries. Direction and relative magnitude of variation of c/a ratio for hexagonal crystals from ideal value for close packing are predicted as a function of electron-atom ratio, and these predictions are compared with values of lattice parameters which are reported in the literature. Diagrams. 24 ref. (M26)

61-M. The Mean Shear Stress in an Array of Dislocations and Latent Hardening. A. N. Stroh. *Proceedings of the Physical Society,* v. 66, sec. B, Jan. 1, 1953, p. 2-6.

Mathematical analysis. 9 ref. (M26)

62-M. Studies and Experimental Investigations for the Development of Phase Diagrams of the Titanium-Chromium and Titanium-Copper Alloy Systems. Part 2. The Titanium-Copper and the Titanium-Chromium Phase Diagrams. Arnold S. Joukainen and Frank B. Cuff. *U. S. Air Force, Air Research and Development Command,* Wright Patterson Air Force Base, Technical Report 6595, Part 2, Dec. 1951, 41 pages.
(M24, Ti, Cr, Cu)

63-M. (French.) **An Etching Agent Revealing Segregation in Aluminum Alloys.** Charlotte Buckle, Christiane Changarnier, and Jean Calvet. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 3, 1952, p. 1040-1041.

Proposes an aqueous solution of 4% potassium permanganate and 2% soda for Al-Mg, Al-Cu, Al-Si, Al-Mn, Al-Cr, and Al-Ti alloys. Techniques and results. (M21, Al)

64-M. (French.) **Thermoelectric Force. Accurate Methods and Applications to the Study of Heterogeneity of Alloy Structures.** F. Aubertin and C. Crussard. *La Metallurgia Italiana,* v. 44, Nov. 1952, p. 548-559.

Methods and data obtained on Al alloys and mild steels. Data are tabulated and charted. 15 ref.
(M23, P15, N12, Al, CN)

65-M. (German.) **The Structure of Weiss's Areas Around Holes in the Surface of Iron-Silicon Crystals.** Bruno Elschner. *Annalen der Physik,* v. 11, no. 1, 1952, p. 45-47.

Beveling and magnetic orientation around holes and inclusions in mechanically and electrolytically polished specimens were studied. Photographs and diagrams.
(M26, P16, Fe, Si)

66-M. (German.) **On the Question of Adapting the Electron Microscope for Structural Investigation of Steels.** Angelica Schrader and Franz Wever. *Archiv für das Eisenhüttenwesen,* v. 23, Nov.-Dec. 1952, p. 489-495.

The electron microscope was used in two cases of alloy steel where the light microscope had failed. It was shown that cementite formation precedes ferrite during pearlitic transformation. In the intermediate transformation step ferrite formation occurs first. (M21, N8, AY)

67-M. The Texture of Iron Scale. Part IV: Investigation of Temperature Range of 930-1470° F. V. I. Arkharov and F. P. Butra. Henry Brutcher, Translation 2869, 7 pages.

Previously abstracted from *Zhurnal Tekhnicheskoi Fiziki.* See item 6b-77, 1948. (M26, Fe)

68-M. Carbides in High Speed Steel. N. T. Chebotarev. Henry Brutcher, Translation 2872, 14 pages. (From *Trudy Moskovskogo Inst. Stali im. I. V. Stalina,"Symposium XXX. Structure and Properties of Steel",* 1951, p. 256-269.)

X-ray photographs of carbide residues, their photometric evaluation, and calculation. Correlation is made between intensities of characteristic diffraction lines and calculated data. (M26, TS)

69-M. Study of Aluminum-Titanium Alloys High in Titanium. W. Gruhl. Henry Brutcher, Translation 2901, 8 pages.

Previously abstracted from *Metall.* See item 151-M, 1952. (M27, Al, Ti)

70-M. Lattice Parameter of Beta Titanium at Room Temperature. B. W. Levinger. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 195.

Brief description. Graphs. 9 ref. (M26, Ti)

71-M. High Temperature Modification of $TiCr_2$. B. W. Levinger. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 196.

X-ray diffraction study of structure. 6 ref. (M26, Ti, Cr)

72-M. System Zirconium-Copper. C. E. Lundin, D. J. McPherson, and M. Hansen. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 273-278.

Experimental procedure and features of Zr-Cu phase diagram. Tables, micrographs, and graphs. 8 ref. (M24, Zr, Cu)

73-M. System Zirconium-Chromium. R. F. Domagala, D. J. McPherson, and M. Hansen. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 279-283.

On basis of metallographic analysis, incipient melting data, thermal analysis work, and X-ray diffraction, phase relationships in 0-50 at. % Cr region were carefully resolved. Phase relationships in 50-100 at. % region were outlined, and single intermediate phase, $ZrCr_2$, was established in the system. Graphs, tables, and micrographs. 8 ref. (M24, Zr, Cr)

74-M. Vanadium-Oxygen Solid Solutions. A. U. Seybolt and H. T. Sumsion. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 292-299.

Results of an investigation of V-rich V-O solid solutions, indicating structure and lattice parameters of α and β solutions and their approximate temperature-composition existence. Micrographs, graphs, and tables. 14 ref. (M26, V)

75-M. Titanium-Manganese System. D. J. Maykuth, H. R. Ogden, and R. I. Jaffee. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 225-230.

Phase diagram for alloys containing from 0-66.9% Mn was determined. Liquid-solid relationships, solid-state equilibria, and X-ray diffraction. Tables, micrographs, and graphs. 10 ref. (M24, N12, Ti, Mn)

76-M. Titanium-Tungsten and Titanium-Tantalum Systems. D. J. Maykuth, H. R. Ogden, and R. I. Jaffee. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 231-237.

Binary phase diagrams for Ti-W and Ti-Ta systems were determined using iodide Ti as a base for Ti-rich alloys and Bureau of Mines Ti as a base for intermediate and high-alloy ranges. Micrographs, graphs, and tables. 7 ref. (M24, Ti, W, Ta)

77-M. Microstructure and Mechanical Properties of Iodide Titanium. F. C. Holden, H. R. Ogden, and R. I. Jaffee. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 238-242.

Effects of heat treatment on

structure and mechanical properties of commercially produced iodide Ti. Correlation between microstructural variables and mechanical properties. Graphs, micrographs, and tables. 6 ref. (M27, Q general, Ti)

78-M. Titanium-Nickel Phase Diagram. Harold Margolin, Elmars Ence, and John P. Nielsen. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 243-247.

Ti-Ni phase diagram was investigated up to 68% Ni with iodide Ti-base alloys by metallographic, X-ray, and melting point methods, and from 68-90% Ni by examination of as-cast structures of sponge Ti-base alloys. Micrographs and graphs. 14 ref. (M24, Ti, Ni)

79-M. Titanium-Carbon Phase Diagram. Irving Cadoff and John P. Nielsen. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Metallurgical Engineers,* v. 197, 1953, p. 248-252.

Investigation in which the Ti-C phase diagram exhibits a peritectic point at 1750° C. and 0.8% C, and a peritectoid point at 920° C. and 0.48% C. Micrographs and graphs. 13 ref. (M24, Ti)

80-M. Constitution of Titanium-Rich Ti-Cr-Al Alloys at 1800° and 1400° F. Jack L. Taylor and Pol Duwez. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 253-256.

Phase boundaries in Ti-Cr-Al were established at 1800 and 1400° F. for alloys containing more than 60% Ti. Martensite transformation temperature was measured for Ti-rich alloys. Diagrams. 17 ref. (M24, N9, Ti, Cr, Al)

81-M. Effect of Small Additions of Oxygen on Lattice Constants and Hardness of Zirconium. R. M. Treco. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 344-348.

Describes investigation. Tables and graphs. 9 ref. (M26, Q29, Zr)

82-M. Thermal and Dilatometric Investigation of the Alloys of Cobalt With Chromium and Molybdenum. A. G. Metcalfe. *Journal of Metals,* v. 5, sec. 2, 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 357-364.

Observations at temperature are used to investigate phase changes in alloys containing more than 50% Co and above 1000° C. Nonsuppressible transformations in Co above 1120° C. and in intermetallic compound Co_2Cr_3 are studied. Liquidus and solidus surfaces are determined. Graphs and tables. 20 ref. (M24, Co, Cr, Mo)

83-M. Tin Bronzes. M. R. Reeve, J. S. Bowden, and J. W. Cutherbertson. *Metal Industry,* v. 82, Jan. 9, 1953, p. 23-25; Jan. 16, 1953, p. 49-52.

Report on microstructure of bronzes containing 15-18% Sn. Second part: Annealing and quenching. Micrographs. (M27, J23, J26, Cu, Sn)

84-M. Metallography—New Instrumentation and Techniques. Augustus B. Kinzel. *Metal Progress,* v. 63, Jan. 1953, p. 78-83.

Latest improvements in phase contrast, ultraviolet microscopes, color metallography, electron microscopes specimen preparation, and polishing techniques. Micrographs. (M21)

85-M. Behaviour of Carbides in Niobium Stabilised Austenitic Stainless Steel. T. V. Simpkinson. *Metallurgia,* v. 47, Jan. 1953, p. 18-24.

How variations in temperature of final hot working, heat treatment, and welding affect type and distribution of precipitated carbides seen under microscope. Tables and microphotographs. 7 ref. (M27, J general, K general, SS)

86-M. The Interaction of Negative μ-Mesons With Uranium Nuclei. W. Galbraith and W. J. Whitehouse. *Philosophical Magazine,* v. 44, Jan. 1953, p. 77-84.

Experimental procedure and results. Diagrams. 24 ref. (M25, U)

87-M. The Interaction of Dislocations and Boundaries. A. K. Head. *Philosophical Magazine,* v. 44, Jan. 1953, p. 92-94.

Evaluates image forces on a screw dislocation due to a grain boundary, or a free surface on which there is a surface film. Al was used. 5 ref. (M26, Al)

88-M. A New Parameter for Use in Discussions of the Shell Model of the Nucleus. N. Feather. *Philosophical Magazine,* v. 44, Jan. 1953, p. 103-106.

Brief theoretical discussion. (M25)

89-M. Electronic Structure of the Germanium Crystal. Frank Herman and Joseph Callaway. *Physical Review,* ser. 2, vx. 89, Jan. 15, 1953, p. 518-519.

Method of orthogonalized plane waves was used to study energy band structure of Ge crystal. Diagram. 10 ref. (M26, Ge)

90-M. A Spiral-Scanning X-Ray Reflection Gonimeter for the Rapid Determination of Preferred Orientations. A. N. Holden. *Review of Scientific Instruments,* v. 24, Jan. 1953, p. 10-12.

Description and advantages. Diagrams and photographs. 4 ref. (M23)

91-M. Magnesium Alloy Research Studies. A. Jones, J. H. Lennon, R. R. Nash, W. H. Chang, and E. G. MacPeek. *U. S. Air Force, Air Research and Development Command, Wright Patterson Air Force Base,* Technical Report 52-169, Sept. 1952, 125 pages.

Diagrams show constitution at 500 and 700° F. for Mg-Li-Al and Mg-Li-Zn alloy systems which were determined by microscopic examination of alloys quenched from elevated temperatures. Tables and graphs. (M24, Mg, Li, Al, Zn)

92-M. (French.) **The Structure and the Stability of Mixed Cobalt-Nickel, Cobalt-Magnesium, and Cobalt-Zinc Oxides.** Jacques Robin. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 24, 1952, p. 1301-1303.

Production of the oxides. Equilibrium diagrams are plotted on the basis of investigations at varying temperatures. Results are interpreted. (M27, Co, Ni, Mg, Zn)

93-M. (French.) **The Application of Sodium Bisulfite as a Micrographic Reagent for Ferritic Steels.** Louis Beaujard and Jacqueline Tordeux. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Nov. 24, 1952, p. 1304-1306.

Proposes a reagent composed of 60 cc. sodium bisulfite solution and 30 cc. water, revealing the structure of steels at room temperature by differential coloring of the ferrite grains. Micrographs. (M21, ST)

94-M. (French.) **Electron Diffraction Studies of Aluminum-Copper Alloys Produced by Thermal Evaporation in a Vacuum.** Jean-Jacques Trillat and Noboru Takahashi. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Nov. 24, 1952, p. 1306-1308.

Experimental arrangement permitting observation of appearance of solid solution and of alloys of definite composition. 5 ref. (M22, Al, Cu)

95-M. (Book.) **The Structure of Steel. Ed. 2.** Edwin Gregory and Eric N. Simons. 140 pages. Blackie & Son Ltd., 66 Chandos Pl., London W. C. 2, England. 8s.

A popularly written yet accurate account of structure of various forms of steel and steel alloys. (M general, ST)

96-M. Effect of Liquid Metal Temperature on Grain Size of High Manganese Steel. S. L. Gertsman. *American Foundryman,* v. 23, Feb. 1953, p. 48.

Brief report throws light on controversy concerning influence of liquid metal temperature on Hadfield's Mn steel. Photographs. (M27, ST)

97-M. The Scanning Electron Microscope and the Electron-Optical Examination of Surfaces. D. McMullan. *Electronic Engineering,* v. 25, Feb. 1953, p. 46-50.

Use for examining metal surfaces. Al was used in experiments. 13 ref. (M21, Al)

98-M. The System InAs-InSb. C. Shih and E. A. Peretti. *Journal of the American Chemical Society,* v. 75, Feb. 5, 1953, p. 608-609.

Presents phase diagram obtained by thermal analysis, X-ray, and metallographic studies. (M24, In, As, Sb)

99-M. Etch-Pits and Dislocations. R. Gevers. *Nature,* v. 171, Jan. 24, 1953, p. 171-172.

Suggests that etching at dislocations will take place following a mechanism which is analogous to Frank mechanism for growth. 3 ref. (M26)

100-M. Dislocations and the Theory of Solids. N. F. Mott. *Nature,* v. 171, Feb. 7, 1953, p. 234-237.

Developments in theory for understanding crystal growth, grain boundaries, and chemical reactions in solids. Diagrams and micrographs. 41 ref. (M26)

101-M. Note on the Electronic Structure of the Transition Metals. N. F. Mott. *Philosophical Magazine,* v. 44, Feb. 1953, p. 187-190.

Discussion of Van der Waals forces between 3*d* and 4*d* shells of transition metals. It is shown that a consideration of their nature may account for low number of conduction electrons in these metals and their alloys. Ni, Co, and Pd were used. (M25, P15, Ni, Co, Pd)

102-M. (Italian.) **Application of X-Ray Spectrometer Geiger-Müller for the Direct Determination of the Velocities of Structural Transformations.** U. Rösler and W. Ruff. *Alluminio,* v. 21, Dec. 1952, p. 573-593.

New method for radiographic study of the kinetics of structural transformations at elevated temperatures. Reports isothermal transformations of Al bronze. Tables, graphs, and diagrams. 25 ref. (M23, Al, Cu)

103-M. Screw Dislocations in Thin Rods. J. D. Eshelby. *Journal of Applied Physics,* v. 24, Feb. 1953, p. 176-179.

Properties of a screw dislocation in a cylinder are worked out in comformance with Galt and Herring's observations on thin whiskers of Sn. (M26, Sn)

104-M. X-Ray Studies on the Texture of Crystals. V. M. Padmanabhan. *Journal of the Indian Institute of Science,* v. 35, sec. A, Jan. 1953, p. 1-8.

Method of studying crystalline texture employing internal reflections. Ground, etched, and chilled crystals of LiF were used. 15 ref. (M26)

105-M. The Use of Diamond Dust for Metallographic Polishing. L. G. Tottle. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 146-150.

Experiments on above and advantages. (M21, Ni)

106-M. Uses of the Hot-Stage Microscope. P. J. E. Forsyth. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 150-151.

Brief discussion on the reflecting microscope objective which has the advantage of large working distance, with the retention of a useful degree of resolution in the optical system. (M21)

107-M. The Use of Geiger Counters in X-Ray-Diffraction Studies. G. K. Williamson. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 152-157.

Various methods for using Geiger counters and similar devices for direct detection of X-ray intensity. (M22)

108-M. The Constitution of Chromium-Manganese Alloys Below 1000° C. W. B. Pearson and W. Hume-Rothery. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 311-314.

Microscopic and X-ray studies in which structures were obtained after annealing 5-71 days. Lattice spacings of solid solution of Mn in α-Cr were determined. Micrographs. (M24, Cr, Mn)

109-M. Line Broadening of Martensite in Nickel Steels. R. A. Smith. *Journal of the Iron and Steel Institute,* v. 173, Feb. 1953, p. 147-152.

X-ray diffraction-line shapes obtained from quenched medium and low-carbon Ni steels which were recorded in a Geiger counter spectrometer. Fourier analysis was used to determine true physical broadening from observed line shapes of martensite and annealed iron. Graphs and tables. 14 ref. (M22, AY)

110-M. Formation of Solid Solutions of Metallic Compounds. I. I. Kornilov. *Metal Progress.* v. 63, Jan. 1953, p. 190, 192. (Translated and condensed by A. G. Guy.)

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 138-M, 1952. (M26)

111-M. Uranium-Graphite Lattices. E. A. Guggenheim and M. H. L. Pryce. *Nucleonics,* v. 11, Feb. 1953, p. 50-60.

Details of methods and results of calculations for seven important quantities, including critical amount of U, reproduction constant, and migration length. (M26, U)

112-M. (German.) Concerning Research Films for Publication. Willi Kuhl. *Mikroskopie Zentralblatt für Mikroskopische Forschung und Methodik,* v. 7, no. 9/10, 1952, p. 296-344.

Methods of perfecting and improving motion pictures for research use. Application to cytological problems is given greatest attention but examples of use in physics, chemistry, metallurgy, and engineering are mentioned. Numerous ref. (M23)

113-M. The Crystal Structure and Superconductivity of Lanthanum. W. T. Ziegler, R. A. Young, and A. L. Floyd, Jr. *Journal of the American Chemical Society,* v. 75, Mar. 5, 1953, p. 1215-1221.

Crystal structure was studied by powder X-ray diffraction techniques at room temperature. The existence of the hexagonal close-packed and face-centered cubic modifications was confirmed. Graphs and tables. 30 ref. (M26, P15, La)

114-M. Preferential Etch for Use in Optical Determination of Germanium Crystal Orientation. R. H. Wynne and Colman Goldberg. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 436.

Brief description. (M21, M26, Ge)

115-M. Grain Boundary Films in Boron Steels. J. W. Spretnak and Rudolph Speiser. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 445-446.

Possibility of a continuous film of B around grains in steels containing 0.0005 to 0.003% B and with ASTM grain sizes from No. 1 through No. 10. Tables. (M27, AY)

116-M. (French.) Irregularities of the Austenitic Grain Size According to the McQuaid Sense. M. Achard. *Circulaire d'Informations Techniques,* v. 10, 1953, p. 131-138.

Causes and remedies. (M27)

117-M. (French.) The Phases of the Al-Fe-Si Ternary System. Marcel Armand. *Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences,* v. 235, Dec. 10, 1952, p. 1506-1508.

Liquation method of separating metals in above system. 9 ref. (M24, C28, Al, Fe, Si)

118-M. (English.) The Neutron-Proton Systems With a Central Exponential Potential. Part I. P. O. Brundell and B. Enander. *Kungl. Tekniska Högskolans Handlingar (Transactions of*

the Royal Institute of Technology), Stockholm, Sweden, No. 60, 1952, 12 pages.

Theoretical analysis. (M25)

119-M. Preparation of Microautoradiographs With the Use of Stripping Film. W. E. Lotz and P. M. Johnston. *Nucleonics,* v. 11, Mar. 1953, p. 54.

Modification of technique to prevent losses during exposure or processing. (M23)

120-M. The Metallographic Preparation of Borides. R. Wachtell. *Powder Metallurgy Bulletin,* v. 6, Feb. 1953, p. 133-134.

Preparation of transition metal-boride alloys by polishing with fine glass powder. (M21, H general, B)

121-M. (English.) **An X-Ray Study of the Phases in the Silver-Zirconium System.** Nils Karlsson. *Acta Chemica Scandinavica,* v. 6, 1952, p. 1424-1430.

Intermediate phases, structure, and range of Ag-Zr systems. Tables. 10 ref. (M24, Ag, Zr)

122-M. Beryllium-Uranium System. R. W. Buzzard. *Journal of Research of the National Bureau of Standards,* v. 50, Feb. 1953, p. 63-67.

The phase diagram was constructed from data obtained by thermal analysis, metallographic examination, and X-ray diffraction. Micrographs and tables. (M24, Be, U)

123-M. A Camera for Texture Mapping by X-Ray Diffraction. C. J. Milner and J. A. James. *Journal of Scientific Instruments,* v. 30, Mar. 1953, p. 77-83.

Construction and operation of a camera designed to give photographs which are recognizable maps of the reference sphere. Diagrams. (M22)

124-M. Austenite Stability and Creep-Rupture Properties of 18-8 Stainless Steels. Jack K. Y. Hum and Nicholas J. Grant. *Transactions of the American Society for Metals,* v. 45, 1953, p. 105-133.

Two series of simple unstabilized 18-8 Cr-Ni steels were tested, one with C from 0.001 to 0.18 % and the second with N_2 from 0.005 to 0.176 %. Effect of these composition changes on structure, and effect of structure on creep-rupture properties were studied. Tables, graphs, and micrographs. 8 ref. (M27, Q3, SS)

125-M. Microstructure. Cyril Stanley Smith. *Transactions of the American Society for Metals,* v. 45, 1953, p. 533-575.

Topological, geometric, and metric aspects of structure. Shows that principal forms of metallic microstructure can be classified in terms of characteristic properties of the interfaces formed between crystals. Ways in which interfaces respond to forces tending to displace them. Diagrams, graphs, and micrographs. 32 ref. (M27)

126-M. The Zirconium-Nickel Phase Diagram. E. T. Hayes, A. H. Roberson, and O. G. Paasche. *Transactions of the American Society for Metals,* v. 45, 1953, p. 893-900.

Diagram for Zr-rich portion of the Zr-Ni system shows limited solubility of Ni in α-Zr at room temperature. Graphs and micrographs. 8 ref. (M24, Zr, Ni)

127-M. (English.) **X-Ray Line Broadening From Filed Aluminium and Wolfram.** G. K. Williamson and W. H. Hall. *Acta Metallurgica,* v. 1, Jan. 1953, p. 22-31.

Changes in line profile with cold work were correlated with changes in intensity. Shows that some lattice defects such as dislocations must be present in the cold worked state. Differences in apparent strains between the Al and W spectra were interpreted in terms of the instantaneous recovery without necessitating either a different mechanism or dislocation density. Graphs. 42 ref. (M22, Q24, Al, W)

128-M. (French.) **Metallographical Determination of Working Temperatures. Case of 80-20 High-Strength, Heat Resisting Nickel-Chromium Alloys.** Ch. Bückle, P. A. Jacquet, and J. Poulignier. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 105-114; disc., p. 114.

Nondestructive method in which different spots of polished and etched specimens are compared to those of a previously heat treated sample of the same alloy. (M21, Q24, SG-h, Ni)

129-M. (French.) **Autoradiographic Study of Homogenization of Phosphorus and Arsenic Dendritic Segregation in Steels.** A. Kohn. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 139-151; disc., p. 151-152.

Tests were made on five carbon and alloy steel ingots containing 0.10% P and 0.10% As. Micro and macrographs. (M23, N12, N, AY)

130-M. (German.) **Metallography of Light Metals. V.** Hans Kostron and Margarete Schippers. *Metall,* v. 7, Jan. 1953, p. 25-29.

Compares structures of extruded pure Al and Al alloys. Micrographs and diagrams. 10 ref. (M27, Al)

131-M. (German.) **Cu-Fe-S Phase Diagram.** Heinz Schlegel and Arno Schüller. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 421-428.

The Cu-Cu_2S-$CuFeS_2$-$FeS_{1.08}$-Fe system was investigated thermally, optically, and by X-rays. Crystallization processes were determined by melting under increased pressure. Photographs. 22 ref. (M24, Cu, Fe)

132-M. (German.) **On the Lattice Constant and Hardness of the Tungsten Carbide Crystal in Hard Metal Structure.** Hans Pfau and Walter Rix. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 440-443.

X-ray techniques were used to determine lattice tension. (M26, C-n)

133-M. (German.) **Condition and Lattice Constants of Cobalt Alloys With Rhenium, Ruthenium, Osmium, Rhodium, and Iridium.** Werner Köster and Elisabeth Horn. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 444-449.

Shows that Co forms uninterrupted series of solid solutions in its ε and γ forms. Graphs. (M26, Co)

134-M. (Spanish.) **Normality and Abnormality of Steels.** Sebastian Feliu Matas. *Revista de Ciencia Aplicada,* v. 6, May-June 1952, p. 229-234.

Examines the meaning of the above terms and studies various factors influencing the final structure of steels. Includes micrographs and tabular data. 19 ref. (M27)

135-M. Measurements of Clustering in Solid Al-Zn Alloys. P. S. Rudman, P. A. Flinn, and B. L. Averbach. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 365.

Measurements made of the X-ray diffuse scattering from solid solutions of Al containing up to 50 atomic % Zn. Graphs. (M22, Al, Zn)

136-M. Limit of Carbide Solubility in 18-10 Stainless. (Condensed from "Solubility of Carbon in 18% Chromium, 10% Nickel Austenite", by S. J. Rosenberg and Carolyn R. Irish.) *Metal Progress,* v. 63, Mar. 1953, p. 164, 166.

Previously abstracted from *Journal of Research of the National Bureau of Standards.* See item 171-M, 1952. (M26, AY)

137-M. Method for Representing Multi-Component Systems. (Condensation of "Method of Representation of Five-Component and More Complex Metallic Systems", I. I. Kornilov.) *Metal Progress,* v. 63, Mar. 1953, p. 190, 192.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 136-M, 1952. (M24)

138-M. Metallographic and Physical Studies of Temper Brittleness of Alloy Structural Steels. E. Kunze. Henry Brutcher Translation 2978, 6 pages. (From *Stahl und Eisen,* v. 72, no. 22, 1952, p. 1367-1368.)

Results obtained by means of various etchants and electropolishing on Cr-Ni and Cr-Ni-Mo steel specimens in tough and embrittled conditions. Results obtained by the use of X-ray back reflection and microhardness tests on the same specimens. (M27, Q23, AY)

139-M. (English.) **Experimental Verification of the Twin System in Alpha-Iron.** H. W. Paxton. *Acta Metallurgica,* v. 1, Mar. 1953, p. 141-143.

Evaluates the crystallographic elements involved in the mechanical twinning of α-iron. 9 ref. (M26, Q24, Fe)

140-M. (English.) **Some Geometrical Relations in Dislocated Crystals.** J. F. Nye. *Acta Metallurgica,* v. 1, Mar. 1953, p. 153-162.

Theoretical discussion of the average lattice curvatures over large distances as compared with *d,* the dislocation spacing. Diagrams. (M26)

141-M. (English.) **Inter-Crystalline Fracture and Twinning of Iron at Low Temperatures.** J. R. Low, Jr. and R. G. Feustel. *Acta Metallurgica,* v. 1, Mar. 1953, p. 185-192.

Shows that small amounts of carbon may strongly influence ductility and mode of fracture of iron at low temperatures. Micrographs. 14 ref. (M26, Q23, Fe)

142-M. (English.) **A "Sub-Regular" Solution Model and Its Application to Some Binary Alloy Systems.** H. K. Hardy. *Acta Metallurgica,* v. 1, Mar. 1953, p. 202-209.

Results of testing a mathematical model against a number of binary solid solutions. Graphs. 33 ref. (M24)

143-M. (English.) **The Phase Diagram Section A-BC (Ordered Compound).** H. K. Hardy. *Acta Metallurgica,* v. 1, Mar. 1953, p. 210-217.

Theoretical discussion on the use of a simple statistical mechanical treatment to account for the properties of the Fe-NiAl phase section. Graphs. 18 ref. (M24, Fe, Ni, Al)

144-M. (German.) **X-Ray Investigations in the Ta-Si System.** H. Nowotny, H. Schachner, R. Kieffer, and F. Benesovsky. *Monatshefte für Chemie,* v. 84, no. 1, 1953, p. 1-12.

Physical properties of $Ta_{4.5\pm0.5}Si$, Ta_2Si, and Ta_5Si_3. (M24, Ta, Si)

145-M. (Book.) **International Tables for X-Ray Crystallography. Vol. I. Symmetry Groups.** Norman F. M. Henry and Kathleen Lonsdale, editors. 558 pages. International Union

of Crystallography, Birmingham, England.

Tabulated information for crystal lattices, point-group symmetry, and space-group symmetry. (M26)

146-M. Effects of Macrostructure on the Performance of Alnico Permanent Magnets. Dolph G. Ebeling and Arthur A. Burr. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 537-544.

Effects of casting texture, grain orientation, and grain size. Single-crystal specimens were produced by special sintering and grain coarsening techniques to study effect of crystal orientation. Results indicate that permanent magnet performance is impaired by a refinement of grain size. Graphs, diagrams, and tables. 16 ref. (M28, P16, SG-n)

147-M. Vanadium-Uranium Constitutional Diagram. H. A. Saller and F. A. Rough. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 545-548.

Experimental procedures and results of studies made to determine constitutional diagram. Micrographs. (M24, V, U)

148-M. Statistical Grain Structure Studies. Plane Distribution Curves of Regular Polyhedrons. F. C. Hull and W. J. Houk. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 565-572.

Plane distribution curves were determined in order to clarify interpretations of grain structures and to assist in calculations of spatial grain size distributions. Characteristics of the distribution curve for the average metal grain are predicted. Graphs and tables. 10 ref. (M27)

149-M. A Note on the Lattice Spacings of Titanium at Elevated Temperatures. R. L. P. Berry and G. V. Raynor. *Research,* v. 6, Apr. 1953, p. 21S-23S.

Experiments indicate that specimens of Ti powder sealed in evacuated silica capillaries are unsuitable for high-temperature X-ray work. (M26, Ti)

150-M. The Lattice Spacing of Two Samples of Super-Purity Aluminium at 25° C. R. B. Hill and H. J. Axon. *Research,* v. 6, Apr. 1953, p. 23S-24S.

Experiments using X-ray techniques. (M26, Al)

151-M. Neutron Diffraction Studies of Various Transition Elements. C. G. Shull and M. K. Wilkinson. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 100-107; disc., p. 107.

Experimental results for V, Nb, Mo, W, Cr, Mn, and Fe. Graphs. (M22, V, Nb, Mo, W, Cr, Mn, Fe)

152-M. Recent Developments in Hard Metals. E. J. Sandford. *Alloy Metals Review,* v. 8, Mar. 1953, p.2-7.

Reviews recent work in phase relationships of cemented and flame plated carbides. Micrographs. 11 ref. (M27)

153-M. Examination of Porcelain Enamel With the Electron Microscope. Ivan Buck. *American Ceramic Society Bulletin,* v. 32, Apr. 1953, p. 114-117.

Application of the electron microscope to the examination of the ground coat-iron interface. Preliminary examinations of the interface and photomicrographs of crystals present in the ground coat. (M27, L27)

154-M. The Origin of Specimen Contamination in the Electron Microscope. A. E. Ennos. *British Journal of Applied Physics,* v. 4, Apr. 1953, p. 101-106.

Electron beam contamination was studied in simple vacuum systems to determine how it originates and methods by which it may be prevented. 20 ref. (M21)

155-M. The Construction of Ball-and-Spoke Models of Crystal Structures. Helen D. Megaw. *British Journal of Applied Physics,* v. 4, Apr. 1953, p. 107-110.

Suggestions for simplifying calculations required in construction of models, and for making models more easily reproducible. (M26)

156-M. The Liquid Immiscibility Region in the Aluminium-Lead-Tin System at 650°, 730°, and 800° C. Morgan H. Davies. *Institute of Metals, Journal,* v. 81, Apr. 1953, p. 415-416.

Tests and results. (M24, Al, Pb, Sn)

157-M. Some Metallographic Observations on Aged Aluminium-Copper Alloys. I. J. Polmear and H. K. Hardy. *Institute of Metals Journal,* v. 81, Apr. 1953, p. 427-431.

Shows that "light phenomenon" is not formed as an integral part of aging process, but originates as a grain-boundary recrystallization process to relieve strains induced by cold-water quenching and subsequent precipitation. Effect of very small additions of In or Sn on aging of Al-Cu alloys were investigated by optical and electron microscopy. 24 ref. (M27, N7, Al, Cu, In, Sn)

158-M. The Log-Log Plot of Solubility Data in Ternary Metallic Sys-

tems. H. K. Hardy. *Institute of Metals Journal,* v. 81, Apr. 1953, p. 432.

Slope of the solubility curve of an ideal ternary solution plotted on log-log coordinates was analyzed for the case when the phase in equilibrium is a ternary compound. Micrographs. (M24, Al, Cu, Mg, Zn)

159-M. Carbides in Chromium, Molybdenum, and Tungsten Steels. Kehsin Kuo. *Iron and Steel Institute Journal,* v. 173, Apr. 1953, p. 363-375.

Occurrence, nature, and internal relations of carbides in Cr, Mo, and W steels are studied by electrolytic extraction and X-ray powder methods with respect to the steel composition and heat treatment. Carbide reactions in these systems are compared and the different mechanisms are discussed. Diagrams and tables. 45 ref.
(M27, N8, ST, Cr, Mo, W, C-n)

160-M. Apparatus Used in the Development of Optical-Diffraction Methods for the Solution of Problems in X-Ray Analysis. W. Hughes and C. A. Taylor. *Journal of Scientific Instruments,* v. 30, Apr. 1953, p. 105-110.

Methods described involve observation of diffraction patterns of holes punched in thin cards to represent atomic arrangements. Details of the instrument that is used to observe these patterns and also of the pantograph-punch that is used to prepare the cards. Diagrams and micrographs. 18 ref. (M22)

161-M. Looking Into the Nucleus. Francis Bitter. *Optical Society of America Journal,* v. 43, Apr. 1953, p. 233-236.

A brief elementary account of nuclear structure which was obtained from investigations of the hyperfine structure of atomic-energy levels. Graphs. (M25)

162-M. The Ultraviolet Microscope. E. Wilfred Taylor. *Optical Society of America Journal,* v. 43 Apr. 1953, p. 299-305.

Form of ultraviolet microscope of the refracting type in which source of radiation is a spark gap between fixed or rotating electrodes and the objectives are normally monochromats. Micrographs. (M21)

163-M. Recent Developments in Electron Microscopy. V. E. Gosslett. *Photographic Journal,* sec. B, *Journal of Photographic Science,* v. 1, Mar.-Apr. 1953, p. 64-70.

Concerned with most important postwar developments, with emphasis on instrument design and operation, including photographic techniques. Examples of use with steel and brass. Photographs and micrographs. 17 ref. (M21, ST, Cu)

164-M. The Hyperfine Structure of the $3p^2P_{1-2}$ State of Al^{27}. Hin Lew and Günter Wessel, *Physical Review,* v. 90, Apr. 1, 1953, p. 1-3.

Presents a recalculation of the nuclear electric quadrupole moment. 9 ref. (M25, Al)

165-M. Some Characteristics of a Low Voltage Electron Immersion Objective. W. W. H. Clarke and L. Jacob. *Physical Society, Proceedings,* v. 66, sec. B, Apr. 1953, p. 284-295.

Study of some characteristics of an objective producing low-energy beams. Rough form of trajectories of specially selected electrons was calculated by a step-by-step method in which the space charge factor was approximately determined at each stage of the motion. Graphs. 7 ref. (M21)

166-M. The Atomic Nucleus and Its Constituents. R. W. Peierls. *Physical Society, Proceedings,* v. 66, sec. A, Apr. 1953, p. 313-324.

Reviews present knowledge of the nucleus and that which was based on Rutherford's work. 10 ref. (M25)

167-M. The Structure of the Nucleus. M. H. L. Pryce. *Science Progress,* v. 41, Apr. 1953, p. 193-211.

Structure of matter; size and mass of the nucleus; constitution of nucleus; mass and binding energy; nuclear reactions and spectroscopy; stability; spin; magnetic moment; electric quadrupole moment; and shell structure. (M25)

168-M. Ferromagnetic Alloys in the System Copper-Manganese-Indium. Robert R. Grinstead and Don M. Yost. *American Chemical Society, Journal,* v. 75, Apr. 20, 1953, p. 1803-1809.

Investigation of Cu-rich portion of the Cu-Mn-In system was made using thermal, microscopic, and magnetic methods. Approximate limits of the α and β-phases were determined. Tables, diagrams, and micrographs.
(M24, Cu, Mn, In, SG-n)

169-M. Antimonial Lead Alloys. Part II. *Metal Industry,* v. 82, Apr. 17, 1953, p. 304.

Variations in results obtained in the study of Pb-Sb system by thermal analysis. (M24, Pb, Sb)

170-M. Preparation of Single Crystals of Titanium and Their Mode of Deformation. A. T. Churchman. *Nature,* v. 171, Apr. 18, 1953, p. 706.

Preparation by a modified strain anneal technique. (M26, Q24, Ti)

171-M. The Equation of Motion of a Dislocation. J. D. Eshelby. *Physical Review,* v. 90, Apr. 15, 1953, p. 248-255.

Elastic field surrounding an arbitrarily moving screw dislocation is found, and a useful analogy with 2-dimensional electromagnetic fields is pointed out. Results are applied to a screw dislocation accelerating from rest and approaching the velocity of sound asymptotically. Applied stress needed to maintain this motion is found on the assumption that the Peierls condition is satisfied near the center of the dislocation. General integral equation of motion is derived for a simplified dislocation model. (M26)

172-M. Electron Microscope Study of the Effect of the Cold Work on the Subgrain Structure of Copper. Laurence Delisle. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 660-666.

Observations on annealed and deformed single crystals and polycrystalline samples of Cr. Micrographs. 19 ref. (M27, Cu)

173-M. Observations on the Phase TiAg. R. J. Van Thyne, W. Rostoker, and H. D. Kessler. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 670-671.

Preparation and examination of samples. (M24, Ti, Ag)

174-M. On the Distribution of Sodium in Modified Al-Si Alloys. A. B. Michael and M. B. Bever. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 679-680.

Experiments to investigate the partition of Na between the primary Al-rich solution and the eutectic. Micrographs. (M26, Al, Na)

175-M. Revealing the Subgrain Structure of Aluminum. M. S. Hunter and D. L. Robinson. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 717-722.

Extremely fine subgrain structure found in Al and Al alloys is shown and a method for revealing this structure is described. Appearance and some characteristics of this structure. Possible significance of subgrain structure in terms of chemical, electrochemical, and metallurgical processes. Micrographs. (M27, Al)

176-M. Alpha Solid-Solution Area of the Cu-Mn-Sn System. C. W. Funk and J. A. Rowland. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 723-725.

Metallographic study. Evaluated results are illustrated with isothermal diagrams for 100° C. increments between 350 and 750° C. Diagrams and micrographs. 13 ref. (M24, Cu, Mn, Sn)

177-M. Calculation of Electron-Density Distribution in Crystals With the Help of Convolution Operations. R. Hosemann and S. N. Bagchi. *Nature,* v. 171, May 2, 1953, p. 785-787.

Mathematical analysis. (M25)

178-M. Isothermal Annealing Effects in Irradiated Copper. Albert W. Overhauser. *Physical Review,* v. 90, May 1, 1953, p. 393-400.

Annealing studies which were part of investigation to study basic properties of lattice imperfections introduced into metals by bombardment with fast particles. Graphs. (M26, J23, Cu)

179-M. Observations of Dislocations in Lineage Boundaries in Germanium. F. L. Vogel, W. G. Pfann, H. E. Corey, and E. E. Thomas. *Physical Review,* v. 90, May 1, 1953, p. 489-490.

Briefly describes study. (M26, Ge)

180-M. A New External Objective Aperture Centering and Interchanging Device for the RCA EMU Electron Microscope. Francis W. Bishop. *Review of Scientific Instruments,* v. 24, Apr. 1953, p. 269-271.

Device which quickly interchanges and centers up to seven objective apertures in the electron microscope consists of a Pt-Ir aperture-carrying tongue which may be moved longitudinally and laterally through a sylphon bellows arrangement. Photographs. (M21, Pt, Ir)

181-M. Direct Measurement of Images in the Electron Microscope. H. Froula. *Review of Scientific Instruments,* v. 24, Apr. 1953, p. 304-306.

Method and a working model for making rapid, moderately accurate measurements of images directly on the fluorescent screen of an electron microscope without the usual intermediate photography. Photographs. (M21)

182-M. A Step Wedge for Sensitometry With the Electron Microscope. J. Hamilton. *Review of Scientific Instruments,* v. 24, Apr. 1953, p. 309-312.

New method of making intensity-scale electron exposures on a photographic emulsion directly in the electron microscope. Contrast and sensitivity of the test emulsion relative to that of the emulsion selected as a standard can be determined quick-

ly and accurately. Characteristics of graininess and sharpness of the test emulsion can readily be evaluated. Graphs. (M21)

183-M. (French.) High Magnification of Metallic Surfaces. G. Vandermeeresche. *Ossature Metallique,* v. 18, no. 4, Apr. 1953, p. 221-225.

Application of the electron microscope. Photographs, diagrams. (M21)

184-M. The Relationship Between Metallic Radii in Body-Centered Cubic and Close-Packed Structures. J. Thewlis. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2279-2280.

Discusses previous calculations using Fe, Ti, Zr, and Tl. (M26, Fe, Ti, Zr, Tl)

185-M. Equilibrium Relations at 460° C. in Aluminium-Rich Alloys Containing 0.7% Copper, 0.7% Magnesium, and 0.6% Silicon. H. J. Axon. *Institute of Metals, Journal,* v. 81, May 1953, p. 449-450.

Results of an investigation into the equilibrium constitution at 460° C. of Al-rich alloys. (M24, Al, Cu, Mg, Si)

186-M. The Constitution of Nickel-Rich Alloys of the Nickel-Chromium-Aluminium System. A. Taylor and R. W. Floyd. *Institute of Metals, Journal,* v. 81, May 1953, p. 451-464.

Equilibrium relationships in alloys containing more than 50 at. % Ni were studied over the temperature range 750-1150° C. The phase fields of the nickel primary solid solution, γ, and of the β solid solution based on NiAl both contract as the temperature falls, whereas that of the γ' phase based on Ni_3Al extends. Graphs, tables. 15 ref. (M24, Ni, Cr, Al)

187-M. Photomicrography in Ultra-Violet Light. E. Wilfred Taylor. *Metal Industry,* v. 82, Apr. 24, 1953, p. 325-326.

Use of ultraviolet radiations as a means of increasing resolution and discriminating between otherwise similar constituents. Micrographs. (M21)

188-M. The Foundations of Metallography. F. C. Thompson. *Metallurgia,* v. 47, Apr. 1953, p. 175-178.

Survey of the state of metallographic knowledge 50 years ago. The existence of several phenomena which only recently were studied extensively was at least surmised, and in some cases known. (M general, A2)

189-M. Neutron Cross Sections in the Mev Region. Murrey D. Goldberg. *Nucleonics,* v. 11, May 1953, p. 42-45.

Problems and progress in work on neutron cross sections. 9 ref. (M25)

190-M. (French.) Physical Chemistry. Reaction Speeds in the System, Iron—Methane—Hydrogen and Its Contribution to the Iron-Carbon Diagram. Gaston Collette and Léon Jacqué. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 12, Mar. 23, 1953, p. 1267-1268.

New information about the Fe-C diagram. Graphs. 4 ref. (M24, Fe)

191-M. (German.) Study of Cu-Mn-Sn System. Siegfried Valentiner. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 59-64.

Crystalline Cu_2MnSn passes, at lower temperatures, into Cu_3Mn_4Sn which is stable at room temperature. It is ferromagnetic and has a Curie point lower than that of the original crystal. (M26, Cu, Mn, Sn)

192-M. (German.) Remarks on the Work of J. Gurland and J. T. Norton on Substructural Formation of Hard Metals. Walther Dawihl. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 69-70.

Discusses Norton's conclusions pertaining to substructures in WC-Co products. Special attention is given to properties of the Co-rich interlayers. (M27, H11, W, Co)

193-M. (German.) Longitudinal Field Filters for Electron Diffraction and Electron Microscopy. H. Boersch. *Zeitschrift für Physik,* v. 134, no. 2, 1953, p. 156-164.

Further development of longitudinal field theory. Result is "grid" and "lens" filters of greater selectivity. (M21, M22)

194-M. A Method of Observing Selected Areas in Electron and Optical Microscopes. J. F. Nankivell. *British Journal of Applied Physics,* v. 4, May 1953, p. 141-143.

Technique enabling systematic observations of metallurgical features in the electron microscope. Permits direct comparison of electron and photomicrographs of any surface detail. Iron-carbon alloy (0.044% C) was used in experiments. Micrographs. (M21, Fe)

195-M. A Model for Demonstrating Dislocations in Crystals. H. G. Van Bueren. *British Journal of Applied Physics,* v. 4, May 1953, p. 144-145.

Simple dynamic model, in which the interatomic forces are simulated partially by magnetic forces and partially by the elastic forces exerted by small springs. Movement of edge and screw dislocations

through a crystal lattice can easily be demonstrated. Photographs. (M26)

196-M. The Measurement of X-Ray Line Breadths. T. R. Anantharaman and J. W. Christian. *British Journal of Applied Physics,* v. 4, May 1953, p. 155-156.

Simple analytical methods for finding the position of the α_1 peak and the integral breadth of the α_1 component of a composite Debye-Scherrer powder line are described. Expressions are exact for symmetrical lines, and sufficiently accurate for very broad asymmetrical lines. Problem of correct location of the background level is considered. (M22)

197-M. A Method for the Quantitative Determination of Preferred Orientation. L. K. Jetter and B. S. Borie, Jr. *Journal of Applied Physics,* v. 24, May 1953, p. 532-535.

A new method for the study of preferred orientation in polycrystalline materials with a Geiger counter X-ray spectrometer is described. Diagrams, photographs, charts. (M23, S11)

198-M. The Effect of a Soller Slit on the Diffraction of X-Rays by Deformed Crystals. B. D. Cullity and Carl A. Julien. *Journal of Applied Physics,* v. 24, May 1953, p. 541-546.

The diffraction geometry of a beam is examined in detail. Shows that striations are due to torsion of the crystal. (M22, N1, Cu, Al)

199-M. The X-Ray Shadow Microscope. V. E. Cosslett and W. C. Nixon. *Journal of Applied Physics,* v. 24, May 1953, p. 616-623.

Practical limitations to resolution, contrast, and exposure time. Diagrams, photographs. 22 ref. (M21)

200-M. Titanium Replica for Electron Microscopy. Shigeto Yamaguchi and Tadayuki Nakayama. *Journal of Applied Physics,* v. 24, May 1953, p. 658.

Making Ti film. Photographs. (M21, Ti, W)

201-M. A Method of Preparing Replicas for Electron Microscopic Examinations. W. S. Smith and W. G. Kirchgessner. *Journal of Applied Physics,* v. 24, May 1953, p. 662.

A modification of the "Formvar" process for making replicas of specimens for electron microscopic examination is described. Photographs. 6 ref. (M21)

202-M. X-Ray Crystallography. Oliver S. Heavens. *Laboratory Practice,* v. 2, May 1953, p. 229-235.

Uses of X-ray diffraction. Experimental arrangements necessary for production of an X-ray beam and for obtaining X-ray patterns. Diagrams. (M22, S11)

203-M. A Surface Contribution to the Debye Specific Heat. R. Stratton. *Philosophical Magazine,* v. 44, May 1953, p. 519-532.

Calculation based on the representation of the possible modes of vibration by points in wave number planes. (M22, Q9)

204-M. (German.) **Structural Composition and Aging of Cu-Mn-Si Alloys.** K. L. Dreyer, *Metall,* v. 7, no. 5 and 6, Mar. 1953, p. 186-189.

By aid of thermal analysis and structural observation, quasibinary section $Cu\text{-}Mn_5\text{-}Si_3$ was determined. Course of solubility boundary of intermetallic phase in Cu was followed. Micrographs, graphs, 3 ref. (M24, Cu, Mn, Si)

205-M. (German.) **Crystal Chemistry of the B-Metals.** Konrad Schubert. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 102-107.

Arguments for crystalline structures of several B-metals, using their correlative positions and block models of electronic theory. Includes experimental data. Diagrams. 21 ref. (M26, As, Sb, Bi)

206-M. (Book.) **X-Ray Crystallography.** Ed. 5. R. W. James. 101 p. 1952. Methuen and Co., London. 7s. 6d.

Covers subject from law of rational indices to Fourier projections and Harker-Kasper inequalities. (M26)

207-M. (Book-German.) **(Outline of Crystal Chemistry.) Grundriss der Kristallchemie.** Johannes E. Hiller. 307 pages. 1952. Walter de Gruyter & Co., Berlin, W 35, Germany.

Comprehensive discussion of various aspects of lattice formations. Lattices of binary and tertiary compounds are included. (M26)

208-M. Some Industrial Applications of Microradiography. S. Goldspiel and F. Bernstein. *Nondestructive Testing,* v. 11, May 1953, p. 15-20; disc., p. 20.

Use with gun metal and nonmetallurgical materials. Micrographs. 22 ref. (M23, Cu)

209-M. The Co-Fe-S System. W. Curlook and L. M. Pidgeon. *Canadian Mining and Metallurgical Bulletin,* v. 46, May 1953, p. 297-301.

Investigation to determine composition at which the compound $Co_{(1-x)}S$ melts congruently. Ternary system Co-Fe-S from the region of 100% $Co_{(1-x)}S$ to the region of 100% $Fe_{12}S_{13}$ was also investigated. Micrographs, tables. 7 ref. (M24)

210-M. Recent Microscopical Techniques in Metallurgy. *Metal Progress,*

v. 63, May 1953, p. 182, 184, 186, 188, 190.

Condensed by S. J. Majka from "Specialized Microscopical Techniques in Metallurgy", by S. Tolansky, Symposium on Properties of Metallic Surfaces, 1952, p. 1-22, published by the Institute of Metals. General survey of the microscope as used in metallurgy, and the advantages of the more recent techniques. (M21)

211-M. A Highly Stable Automatic X-Ray Diffraction Apparatus With Only One Moving Part. Claude K. Jones. *Review of Scientific Instruments,* v. 24, May 1953, p. 380-387.

Modifications which were added to existing automatic X-ray diffraction apparatus. It was possible to produce records of X-ray diffraction patterns of a powdered crystal which can be duplicated time after time within the limit of errors introduced by the statistical arrival of the diffracted quanta. Diagrams, graphs. (M22)

212-M. Method for Cutting and Shaping Fragile Crystals. Ray Pepinsky. *Review of Scientific Instruments,* v. 24, May 1953, p. 403.

Brief description. (M23)

213-M. A Method for Improvement of Contrast of X-Ray Diffraction Photographs. David W. Levinson. *Review of Scientific Instruments,* v. 24, June 1953, p. 468-469.

Method to remove fogging of X-ray diffraction photographs by bleaching. Photographs. (M22)

214-M. (English.) **Further Notes on the Shape of Metal Grains. Space-Filling Polyhedra With Unlimited Sharing of Corners and Faces.** C. S. Smith. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 295-300.

Statement that there is a topological limit to the sharing of corners in a network of 3-dimensional cells analogous to metal grains is shown to be wrong. New space-filling irregular polyhedra sharing faces with as many as 20 neighbors are sketched. Equation is derived for the sum of angles at each vertex in a 3-dimensional space-filling array of plane-faced polyhedra. (M27)

215-M. (English.) **The Estimation of Dislocation Densities in Metals From X-Ray Data.** P. Gay, P. B. Hirsch, and A. Kelly. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 315-319.

Methods by which density of the excess dislocations of one sign in the boundaries between particles can be found from data obtained from X-ray diffraction photographs. Methods may be extended to give estimates of the excess and total dislocation densities within the particles and the densities in annealed metals. (M26, M22)

216-M. (English.) **The Structure of Gamma Manganese.** Eric R. Morgan. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 377-378.

Investigations. (M27, Mn)

217-M. (German.) **Anodic Polishing of Microsections in Metallography.** W. Strohfeld. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 436-441.

Quick electrolytic process which provides easy handling and rapid attainment of a good polish. Micrographs, tables. (M21, Al)

218-M. (German.) **The Ternary Lead-Cadmium-Bismuth and Lead-Tin-Bismuth Alloys.** Teh-Hsuan Ho, Wilhelm Hofmann, and Heinrich Hannemann. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 127-129.

Ternary diagrams were redetermined because of discovery of hexagonal β-phase of Pb-Bi. Phase diagrams, photomicrographs. 7 ref. (M24, Pb, Cd, Bi)

219-M. (German.) **The Lead-Silver-Sulfur System.** Rudolf Vogel. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 133-135.

Determines equilibrium of Pb-PbS-Ag_2S phase by thermal and structural analysis. Eutectic curve was found to cross miscibility gap. Graphs, micrographs. 4 ref. (M23, Pb, Ag)

220-M. Metallurgical Characteristics of the Heavy Elements. B. W. Mott. *Research* (London), v. 6, June 1953, p. 238-246.

Published data on the heavy metals and their compounds including crystal structures, atomic sizes, valences, and magnetic properties. Tables. 27 ref. (M26, P10, P16, EG-h)

221-M. Phase Ratio Determination by an X-Ray Method. J. Gordon Parr. *Research* (London), v. 6, June 1953, p. 37s-38s.

Work on Fe-Mn alloys. (M22, Fe, Mn)

222-M. A Simplified Procedure for the Metallography of Zirconium and Hafnium and Their Alloys. F. M. Cain, Jr. Paper from Zirconium and Zirconium Alloys, p. 176-185, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Chemical polish-etch method for metallographic preparation of Zr and Hf and their alloys without the aid of mechanical or electrolytic polishing. Remote controlled metallography of irradiated specimens, nondestructive microscopic examination of large sections, macro prepa-

ration, bright pickling, and reducing dimensional thicknesses are examples of the versatility of the chemical polish. Micrographs. (M21, Zr, Hf)

223-M. The System Zirconium-Silicon. C. E. Lundin, D. J. McPherson, and M. Hansen. Paper from Zirconium and Zirconium Alloys, p. 208-221, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Phase diagram was determined with particular emphasis on the Zr-rich portion. Principal methods used were metallography of cast and heat treated specimens; detection of incipient melting; thermal analysis; and X-ray diffraction analysis. Micrographs, tables. (M24, Zr, Si)

224-M. The System Zirconium-Tin. D. J. McPherson and M. Hansen. Paper from Zirconium and Zirconium Alloys, p. 222-238; disc., p. 239-240, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Highly reactive Zr-Sn alloys were prepared and heat treated under protective conditions. Phase diagram was established by metallography and X-ray diffraction; metallographic detection of incipient melting; and thermal analysis. Micrographs, tables. 6 ref. (M24, Zr, Sn)

225-M. The Zirconium-Manganese Phase Diagram. A. H. Roberson, E. T. Hayes, and V. V. Donaldson. Paper from Zirconium and Zirconium Alloys, p. 283-291, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Constitutional diagram covering the Zr-rich portion of the Zr-Mn system was developed. Tables, micrographs. 6 ref. (M24, Zr, Mn)

226-M. (English.) **Evidence of a Band Structure in the Compton Radiation From Solids.** Kessar Alexopoulos and and Gösta Brogren. *Arkiv för Fysik,* v. 6, no. 3, 1953, p. 213-222.

Experiments carried out with copper K α-radiation scattered on Be and C under angles between 17 and 45°. Graphs. 14 ref. (M25, Be, Cu)

227-M. (French.) **Principles of Direct Determination of the Parameters of Crystalline Organization.** Jacques Mering and Jacqueline Longuet-Escard. *Comptes Rendus hebdomadaires des des Séances de l'Académie des Sciences,* v. 236, no. 15, Apr. 13, 1953, p. 1501-1503.

X-ray diffraction study of crystal line growth of nickel hydroxide. (M22, M26, Ni)

228-M. (German.) **An Improved Process of Contact Radiography.** J. Rasch. *Experientia,* v. 9, no. 4, Apr. 4, 1953, p. 149.

Use of collodion emulsions in autoradiograph technique. This technique is applicable to physiological and metallographic problems. 6 ref. (M23)

229-M. (German.) **Metallography of Light Metals. VIII. Formation and Decomposition Processes During Crystallization.** Hans Kostron and Margarete Schippers. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 192-197.

Studies on Al to explain decomposition by heat and "concentration" waves. Micrographs. 13 ref. (M26, Al)

230-M. (German.) **Investigation of the Ternary System: Al-Fe-Zn.** Erich Gebhardt. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 206-211.

Several boundary systems were studied. Eutectic points were determined. Micrographs, diagrams. 18 ref. (M24, Al, Fe, Zn)

231-M. (German.) **Phase Diagram of Aluminum-Magnesium System.** Klaus Eickhoff and Hugo Vosskühler. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 223-231.

Compares data on Al-Mg system. Tables, diagrams. 72 ref. (M24, Al, Mg)

232-M. Techniques for the Electron Microscopy of Crystals. I. M. Dawson. *British Journal of Applied Physics,* v. 4, June 1953, p. 177-181.

New electron microscopy techniques and modifications of existing techniques are discussed with reference to the examination of crystals. Methods of preparing crystals, replica techniques, and shadow-casting. 20 ref. (M21)

233-M. The Use of Diamond Abrasives for a Universal System of Metallographic Polishing. L. E. Samuels. *Institute of Metals, Journal,* v. 81, June 1953, p. 471-478.

Investigations to determine most efficient and economical methods. Photographs. 26 ref. (M21, Bi, Sn, Cd, Pb, Zn, Mg, Al, Ag, Cu, ST, Ni, Ti)

234-M. The Solubility of Indium in Copper. E. A. Owen and E. A. O'Donnell Roberts. *Institute of Metals, Journal,* v. 81, June 1953, p. 479-480.

The α-phase boundary of the Cu-In system from 710 to 470° C. is recorded. Tables, graphs. 4 ref. (M24, Cu, In)

235-M. Macroscopic Spirals and the Dislocation Theory of Crystal Growth. N. Cabrera. *Journal of Chemical Physics,* v. 21, June 1953, p. 1111-1112.

Stabilization of the macroscopic step forming the spiral. 5 ref. (M28, M26)

236-M. Microscopical Examination of Tin Bronzes in the Alpha Range. E. C. W. Perryman. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 906-910.

On electropolishing, high-purity Cu-Sn and Cu-Sn-P alloys with more than 5 to 9% Sn were found to contain many grain boundaries with a ridge-and-furrow profile, due to enrichment of certain boundaries in tin, or possibly by an impurity present in the tin as a solid solution. Micrographs. 12 ref. (M21, M27, Cu, Sn)

237-M. Grain Boundary Attack on Aluminum in Hydrochloric Acid and Sodium Hydroxide. E. C. W. Perryman. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 911-917.

Investigation for high-purity Al-Fe alloys with up to 0.055% Fe as a function of Fe content and heat treatment. Results can be explained on the assumption that Fe segregates to the grain boundary in solid solution. Micrographs, tables. 17 ref. (M27, Al)

238-M. A Precision Back-Reflexion Microbeam X-Ray Camera With Provision for Pre-Selecting the Irradiated Area. R. W. Cahn. *Journal of Scientific Instruments,* v. 30, June 1953, p. 201-204.

A camera which allows the orientations of pre-selected individual grains in an aggregate to be accurately determined. A pinhole in a metal foil mounted next to the specimen is used as a reference point, through which the X-ray beam is sent by taking readings from an electronic counter placed behind the foil. Principles of X-ray collimation. (M22)

239-M. Metallography of Hafnium. H. P. Roth. *Metal Progress,* v. 63, June 1953, p. 84-89.

Samples for investigation and experimental procedure. As received, cold swaged, and annealed samples were examined. Micrographs. 17 ref. (M general, Hf)

240-M. Rational Phase Nomenclature. *Metal Progress,* v. 63, June 1953, p. 136, 138, 140, 142, 144.

Work by subcommittee 3, ASTM Committee on Metallography for standardizing terms used in phase studies. (M24, S22)

241-M. Difference Between the Density Distribution of Neutrons and Protons in Atomic Nuclei. P. Gombas. *Nature,* v. 171, May 30, 1953, p. 979-980.

Method of calculation. (M25)

242-M. The Small Angle Scattering of X-Rays From Cold-Worked Solids. D. L. Dexter. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1007-1012.

Computations on scattering expected from clustered cavities and from dislocations. 11 ref. (M26, Pb)

243-M. A Neutron Diffraction Study of Magnesium Ferrite. L. M. Gorliss, J. M. Hastings, and F. G. Brockman. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1013-1018.

Experimental and computation methods and an analysis of diffraction patterns. Graphs. 14 ref. (M22, Mg, Te, Mn, Zn)

244-M. Nuclear Hyperfine Structure of Mn. Mendel Sachs. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1058-1060.

Theoretical calculation of nuclear hyperfine splitting in Mn^{++}. 8 ref. (M25, Mn)

245-M. Dislocation Nodes in Face-Centered Cubic Lattices. N. Thompson. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 481-492.

Imposition of requirements of crystal geometry on the arrangement of partial dislocations at a node. Graphs. 5 ref. (M26)

246-M. (English.) On the System Manganese-Tellurium. S. Furberg. *Acta Chemica Scandinavica,* v. 7, no. 4, 1953, p. 693-694.

Relationships within the system of Mn and Te alloys. 7 ref. (M24, Mn, Te, Ti, Ni)

247-M. (German.) Phase Diagram for Iron-Iron Sulfide-Cobalt Sulfide-Cobalt. Rudolf Vogel and Gerhardt Friedrich Hillner. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 133-141.

Continuation of eutectic changes by peripheral systems in ternary region. Displacement of homogeneity range of CoS toward S was determined microscopically for Co-CoS system. Photographs, graphs, diagrams. 14 ref. (M24, Fe, Co)

248-M. (German.) Electrodeposited Alloys. E. Raub. *Metalloberfläche,* v. 7, no. 2, Feb. 1953, p. A17-A27.

Structure and mechanical properties of electrodeposited alloy crystals. Deviations from cast alloys are caused by lattice distortions. Graphs. (M26, L17, Q general, Cu, Zn, Cd, Ni)

249-M. Modification of High-Silicon Aluminium Alloys and the Corresponding Structures. Claude Mascré. *Foundry Trade Journal,* v. 94, June 25, 1953, p. 725-730.

Action of P and Na on hypereutectic Al-Si alloys. Diagrams, graphs, micrographs. 6 ref. (M27, Al)

250-M. The Structure of Titanium-Tin Alloys in the Range 0-25 At. % Tin. H. W. Worner. *Institute of Metals, Journal,* v. 81, July 1953, p. 521-528.

Experiments on two groups of alloys. Tables. 6 ref. (M27, Ti, Sn)

251-M. Titanium-Uranium System in the Region 0 to 30 Atomic Percent of Titanium. R. W. Buzzard, R. B. Liss, and D. P. Fickle. *National Bureau of Standards, Journal of Research,* v. 50, Apr. 1953, p. 209-214.

Tentative Ti-U phase diagram is amplified by thermal, microscopic, and X-ray analyses of alloys from 0 to 30 atomic % of Ti. Micrographs. (M24, M21, Ti, U)

252-M. A New Method of Making Electron Microscope Specimen Support Films. D. E. Bradley *Nature,* v. 171, June 13, 1953, p. 1076-1077.

Forming thin film suitable for specimen mounting. Photographs. (M21)

253-M. Structure of Magnesium-Lithium β-Phase Alloys. R. L. P. Berry and G. B. Raynor. *Nature,* v. 171, June 13, 1953, p. 1078-1079.

(M26, Mg, Li)

254-M. Examination of Surfaces by X-Ray Reflection. R. H. Buteux. *Optical Society of America, Journal,* v. 43, July 1953, p. 618.

Examples. Photomicrographs. (M22, Au, Ag, Sn, Cu, Al, Mg, Sb, Te)

255-M. Nuclear Levels in Cs^{131}. J. M. Cork, J. M. LeBlanc, W. H. Nester, and M. K. Brice. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 76-77.

Results of radiation from Ba^{131}. 8 ref. (M25, Cs, Ba)

256-M. (English.) **The Crystal Structures of CeB_4, ThB_4, and UB_4.** Allan Zalkin and D. H. Templeton. *Acta Crystallographica,* v. 6, Mar. 1953, p. 269-272.

Metal locations are determined by X-rays and the boron locations by geometrical considerations. Method for making absorption corrections for highly absorbing crystals of prismatic form. Diagrams, tables. (M26, Ce, Th, U, B)

257-M. (English.) **The Structure of $MnAl_6$.** A. D. I. Nicol. *Acta Crystallographica,* v. 6, Mar. 1953, p. 285-293.

Experimental methods used and accuracy obtained in the structure analysis. Mn-Al and Al-Al interatomic distances are discussed in detail. Tables, diagrams. 24 ref. (M26, M25, Mn, Al)

258-M. (English.) **The Interpretation of X-Ray Powder Photographs of Crystals of Low Symmetry.** J. Thewlis and T. S. Hutchison. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 357-358.

Method, determination of unit cell, and application of method to alpha-U. (M22, U)

259-M. (English.) **X-Ray Evidence for the Interstitial Position of Carbon in Alpha Iron.** G. K. Williamson and R. E. Smallman. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 361-362.

Structure analysis. (M26, Fe)

260-M. (English.) **Influence of Mosaicity on the Bragg Reflexion of Polarized X-Rays.** S. Ramaseshan and G. N. Ramachandran. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 364-365.

Theoretical analysis. (M22)

261-M. (English.) **The Antiferromagnetic Structure Deformations in CoO and MnTe.** Selma Greenwald. *Acta Crystallographica,* v. 6, pt. 5, May 1953, p. 396-398.

CoO and MnTe were studied above and below their antiferromagnetic Curie temperatures with a symmetrical back-reflection camera. Graphs. (M26, Mn, Te)

262-M. (English.) **Crystal Structure and Antiferromagnetism of CrSb.** B. T. M. Willis, *Acta Crystallographica,* v. 6, pt. 5, May 1953, p. 425-426.

Experimental investigation. (M26, P16, Cr, Sb)

263-M. (English.) **Optimum Geometric Conditions in the Design and Use of X-Ray Diffraction Tubes and Cameras.** H. E. Huxley. *Acta Crystallographica,* v. 6, June 1953, p. 457-465.

Theory is developed which enables optimum geometric conditions to be determined under various conditions. Validity of simplifying assumptions. Implications of the analysis. It is concluded that a need exists for X-ray tubes of variable focal size. Tables. (M22)

264-M. (English.) **A Method for the Estimation of Transmission Factors in Crystals of Uniform Cross Section.** N. Joel, R. Vera, and I. Garaycochea. *Acta Crystallographica,* v. 6, June 1953, p. 465-468.

Method and examples of application. Expected accuracy. Diagrams, tables. (M26)

265-M. (English.) **A Three-Dimensional Coordinate Model for Demonstration of Inorganic Crystal Structures.** A. J. E. Welch. *Acta Crystallographica,* v. 6, June 1953, p. 476-477.

A transparent plastic framework in which colored pins may be inserted to show the arrangements of atoms in simple unit cells. (M26)

266-M. (English.) **The Interpretation of Diffuse X-Ray Reflexions From Single Crystals. II.** J. Hoerni and W. A. Wooster. *Acta Crystallographica,* v. 6, June 1953, p. 543-547.

Factors affecting the intensity of X-ray reflections from single crystals. Divergence corrections which make allowance for the fact that the beam is not infinitely narrow and the crystal is not ideally perfect. Diagrams. (M26)

267-M. Optical Microscopy. George L. Kehl. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 1-32.

Phase contrast microscopy, the reflecting-type objective, and their application to metallurgy. The reflection technique permits extensive working distances. Any reasonable wave length of radiation may be used (3500Å to 26000Å). (M21)

268-M. Field Emission Microscopy. Erwin W. Müller. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 33-50.

"Microscope" which is a specialized cathode-ray tube. Device is capable of 500,000 X on films on the order of 2Å thick. Problems of the instrument. (M21)

269-M. Electron Diffraction and Microscopy of Metals. R. D. Heidenreich. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 51-71.

Several cases where the above revealed new facts on the metals studied. Emphasizes careful sample preparation. Alnico V is described. (M22, M21, SG-n)

270-M. X-Ray Diffraction Techniques. Charles S. Barrett. "Modern Research Techniques in Physical Metallurgy." American Society of Metals, Cleveland, p. 72-94.

Limited to production and measurement of X-rays. Reviews modern X-ray tubes, monochromators, and counting tubes for intensity measurement. (M22)

271-M. The Diffuse Scattering of X-Rays. B. E. Warren and B. L. Averbach. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 95-130.

Diffuse pattern shows the level of disorder in a crystal in contrast to the sharp Bragg reflections. Resolution of four other sources of diffusion and mathematics of analysis. (M22)

272-M. Crystal Orientation and Pole Figure Determination. A. H. Geisler. "Modern Research Techniques in Physical Metallurgy". American Society for Metals, Cleveland, p. 131-153.

Older "cut-and-try" methods. Diagrams of principles involved. Describes such recent tools as the integrating pole figure goniometer and automatic pole figure recorder. (M23)

273-M. Techniques and Applications of Neutron Diffraction. C. G. Shull. "Modern Research Techniques in Physical Metallurgy". American Society for Metals, Cleveland, p. 154-169.

Compared with present X-ray techniques, recent studies, and applications. (M22)

274-M. (French.) **Regarding Some Quantities Depending on the Crystalline Symmetry of Metals.** G. Bonfiglioli, A. Ferro, and G. Montalenti. *Journal de Chemie Physique et de Physico-Chimie Biologique,* v. 50, no. 1, Jan. 1953, p. 22-25.

Theoretical study. Tables. (M26)

275-M. (Russian.) **Structural Diagrams of Metallic Systems on a Chromium Base.** I. I. Kornilov and V. S. Mikheev. *Uspekhi Khimii,* v. 22, no. 1, Jan. 1953, p. 87-98.

Alloys of Cr with various elements and typical phase diagrams for each group. Study made in connection with production of new type Cr alloys. Tables, figures. 36 ref. (M24, Cr)

276-M. (Book.) **The Intelligent Use of the Microscope. Ed. 2.** C. W. Oliver. 192 p. 1953. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y.

Optical theory; components and accessories of the microscope; selecting the right equipment; illumination; filters; and special instruments and applications. (M21)

277-M. (Book.) **Modern Research Techniques in Physical Metallurgy.** 335 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. $5.00.

A seminar of 14 papers presented at the 34th National Metal Congress and Exposition in Philadelphia on Oct. 18 to 24, 1952, sponsored by ASM. Papers abstracted separately. (M general, N general)

278-M. (Book—German.) **(Handbook of Ore Microscopy.) Erzmikroskopisches Praktikum.** Hans Schneiderhöhn. 274 p. 1952. E. Schweizerbart'sche Verlagsbuchhandlung (Erwin Nägele), Stuttgart, Germany.

Includes chapters on optical examination methods; chemical reactions on polished surfaces; and microchemical, spectrographic, and X-ray determination of ore minerals. (M21)

279-M. The Electron Microscope in Metallurgical Research. R. D. Stacey. *Birmingham Metallurgical Society, Journal,* v. 33, June 1953, p. 53-62.

Various types of electron microscopes, together with the limitations imposed by replica techniques. Some applications in metallurgical research. 10 ref. (M21)

280-M. Recent Developments in Metallurgical Microscopy. B. Arnold. *Birmingham Metallurgical Society, Journal,* v. 33, June 1953, p. 63-78.

Development of ultraviolet light microscope, polarized light microscope, phase-contrast microscopy, opaque-stop microscope, high-temperature microscopy, and electron microscope. Diagrams. 6 ref. (M21)

281-M. The Crystal Structure of $ThSe_2$ and Th_7Se_{12}. R. W. M. D'Eye. *Chemical Society, Journal,* June 1953, p. 1670-1672.

Determined by the X-ray powder technique with Guinier-type cameras. $ThSe_2$ is orthorhombic and Th_7Se_{12} is hexagonal. Crystal data. (M26, Th, Se)

282-M. The Liquidus⇌Solidus Relations in the System Iron-Cobalt in the Range 0-30 Atomic % Cobalt. G. B. Harris and W. Hume-Rothery. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 212-217; disc., p. 217-218.

Apparatus for accurate determination of liquidus and solidus points of Fe alloys by thermal analysis, and details of experimental technique. Diagram, graphs, tables. 13 ref. (M23, M24, Fe, Co)

283-M. Examination of a High Sulphur Free-Machining Ingot, Bloom and Billet Sections. D. J. Carney and E. C. Rudolphy. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 999-1008.

Ingot solidification, size, shape, distribution and composition of inclusions from the ingot to the billet in a high-sulphur, free-machining steel. Diagrams, tables, micrographs, graphs. 14 ref. (M28, CN)

284-M. Modifications of the Schulz Technique for the X-Ray Determination of Preferred Orientation in Rolled Metal. M. L. Fuller and George Vaux. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1038.

Apparatus and operation. Photograph. (M22, N5)

285-M. An X-Ray Camera for Measuring Preferred Orientation in Wires. A. L. Mackay. *Journal of Scientific Instruments,* v. 30, July 1953, p. 244-245.

A camera combining the advantages, for orientation determination, of flat plate and normal powder cameras. Diagram, graph. 4 ref. (M22, N5, Cu)

286-M. Electron Microscope Photographs of Polished Mineral Surfaces. J. Kenyon. *Nature,* v. 172, July 18, 1953, p. 114-115.

Preparation of thin-film replicas of polished surfaces. Photographs. (M21)

287-M. *p-n* Junction Revealed by Electrolytic Etching. E. Billig and J. J. Dowd. *Nature,* v. 172, July 18, 1953, p. 115.

Method based on rectifying behavior of the junction. Table, photograph. (M21, P15, Ge)

288-M. The Study of Crystal Growth With the Electron Microscope. III. Growth-Step Patterns and the Relationship of Growth-Step Height to Molecular Structure in *n*-Nonatriacontane and in Stearic Acid. N. G. Anderson and I. M. Dawson. *Royal Society, Proceedings,* v. 218, ser. A, June 1953, p. 255-268.

Procedure and results. Diagrams, micrographs. 25 ref. (M21, N12)

289-M. (English.) **Stacking Faults in γ-Alumina.** J. M. Cowley. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 53-54.

Electron-diffraction patterns of gamma-alumina show extra spots. These are described as faults in the cubic stacking of O atoms. Some Al atom sites are "unfavorably" near normal Al atoms. Suggests that vacant Al sites, occur preferentially in γ-alumina. (M25, Al)

290-M. (English.) **Two Unconventional Uses of a Weissenberg Goniometer.** E. J. W. Whittaker. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 93.

For equi-inclination rotation photography and for semi-integrating rotation photography. (M23)

291-M. (English.) **The Crystal Structure of the Intermetallic Compound $Mg_6Si_7Cu_{16}$.** Gunnar Bergman and John L. T. Waugh. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 93-94.

Determined by stochastic method. Findings agree with those of Witte who used the X-ray method. (M26, Mg, Si, Cu)

292-M. (English.) **The External Shape of Antimony Oxide (Sb_2O_3) Formed on the Cleavage Surface of Stibnite.** Masaru Watanabe and Ryuzo Ueda. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 95.

Direct observation of Sb_2O_3 by

electron micrography does not agree perfectly with the results from electron diffraction studies. (M26, M21, M22, Sb)

293-M. (English.) **The Crystal Chemistry of the Laves Phase.** R. L. Berry and G. V. Raynor. *Acta Crystallographica,* v. 6, pt. 2, Feb. 1953, p. 178-186.

Interatomic distances were examined in $C_{14}(MgZn_2)$, $C_{15}(MgCu_2)$ and $C_{36}(MgNi_2)$ crystals. Considerations can be used in the prediction of Laves phases in new alloy systems. (M26, Mg, Zn, Cu, Ni)

294-M. (English.) **The Crystal Structure of NaPb.** Richard E. Marsh and David P. Shoemaker. *Acta Crystallographica,* v. 6, pt. 2, Feb. 1953, p. 197-205.

Determined by crystal and powder X-ray diffraction. Data are presented. (M26, Na, Pb)

295-M. (English.) **The Crystal Structure of $BaCd_{11}$.** M. J. Sanderson and N. C. Baenziger. *Acta Crystallographica,* v. 6, July 10, 1953, p. 627-631.

Experimental procedures, X-ray data and structure determination. Tables, digarams. (M26, Cd, Ba)

296-M. (English.) **The Polarization Factor for Inclined-Beam Photographs Using Crystal-Reflected Radiation.** E. J. W. Whittaker. *Acta Crystallographica,* v. 6, pt. 2, Feb. 1953, p. 222-223.

Describes above when polarization is increased by crystal reflection. (M23)

297-M. (English.) **X-Ray Scattering by Aggregates of Bonded Atoms. III. The Bond Scattering Factor. Simple Methods of Approximation in the General Case.** R. McWeeny. *Acta Crystallographica,* v. 6, July 10, 1953, p. 631-637.

General approximate methods of calculating the bond scattering factor formulas covering all cases arising from bonds involving (1s), (2s) and (2p) electrons. Includes graphs. 11 ref. (M25)

298-M. (English.) **The Location of Oxygen Atoms in Vanadium-Oxygen Alloys by Means of Neutron Diffraction.** C. W. Tucker, Jr., A. U. Seybolt, and H. T. Sumison. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 390-393.

Compares X-ray and neutron diffraction methods for locating oxygen atoms in alloys. (M22, V)

299-M. (English.) **The Surface Structures of Deformed Aluminium, Copper, Silver, and Alpha Brass, and Their Theoretical Interpretation.** Doris Kuhlmann-Wilsdorf and Heinz Wilsdorf. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 394-413.

An electron microscope examination. Micrographs. 46 ref. (M26, M21, Al, Cu, Ag)

300-M. (English.) **High-Temperature Hexagonal Phase of Cobalt.** J. B. Newkirk and A. H. Geisler. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 456-457.

Results of experiments. (M26, Co)

301-M. (French.) **A New Phase in Aluminum-Copper Alloys.** Jean Jacques Trillat and Noboru Takahashi. *Comptes Rendus hebdomadaires des Seances de l'Academie des Sciences,* v. 236, no. 23, June 8, 1953, p. 2245-2247.

After aging a thin film of Al-Cu alloy (40% Al) at room temperature a new phase (type CsCl) was detected. (M26, Cu, Al)

302-M. (French.) **The Electron Microscope Gives Evidence of a Fine Sub-Structure in Crystals of Aluminum and Its Alloys.** Pierre Bussy and Georges Chaudron. *Comptes Rendus hebdomaidaires des Seances de l'Academie des Sciences,* v. 236, no. 24, June 15, 1953, p. 2323-2325.

Studies were made with Al-Cu alloys containing 0.5 to 4.0% Cu. (M26, M21, Al, Cu)

303-M. (French.) **Researches on the Crystallization of Cast Irons Containing Spheroidal Graphite.** A. Wittmoser. *Revue de Métallurgie,* v. 50, no. 6, June 1953, p. 413-423.

Thermal analysis and microexamination of cast iron containing 1.5-4% C and 0.6-3% Si with and without heat treatment. Photographs, graphs. 27 ref. (M27, M23, CI)

304-M. (German.) **Increase in Lattice Spacing of Crystals by Additions.** J. Teltow. *Annalen der Physik,* v. 12, nos. 1-3, Apr. 1953, p. 111-120.

Corresponding data from macroscopic and radiographic investigations. 8 ref. (M26)

305-M. (German.) **Precision Investigations on the Zinc Lattice. Precision Measurements of the Lattice Constant and Investigation on Lattice Distortions.** Betsy Ancker. *Annaler der Physik,* v. 12, nos. 1-3, Apr. 1953, p. 121-144.

Comparison with other methods and a way to obtain a distortion-free lattice. Tables. 34 ref. (M26, Zn)

306-M. (German.) **Precision Investigation on Zinc Lattice. II. Twin Formation.** Betsy Ancker. *Annalen der Physik,* v. 12, nos. 1-3, Apr. 1953, p. 145-154.

Manner of growth of twin lamellas and development of the mosaic structure. Photographs, graphs. 15 ref. (M26, Zn)

307-M. (German.) **Conversions of Iron Phosphides With Liquid Zinc.** Rudolf Vogel and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 247-249.

Established equilibrium lines of the Fe-P-Zn group. Fe has greater affinity for P. Photographs. 4 ref. (M24, Fe, P, Zn)

308-M. (German.) **Hard-Metal Alloys of Higher Corrosion and Oxidation Resistance.** Josef Hinnüber and Otto Rüdiger. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 267-274.

Metallographic and X-ray studies on chromium carbide-Ni and chromium carbide-Co systems. Relation of phase structure and properties. 21 ref. (M24, Cr, Ni, Co)

309-M. (German.) **The Structure of Several Silicide Systems of Transition Metals.** H. Nowotny, H. Schroth, R. Kieffer, and F. Benesovsky. *Monatshefte für Chemie,* v. 84, no. 3, June 1953, p. 579-584.

Results of X-ray studies of the pseudo-binary systems $TiSi_2$—$CrSi_2$, $CrSi_2$—$TaSi_2$, and Cr_3Si—Mo_3Si. Tables, graphs. 6 ref. (M26, M24, Ti, Cr, Mo, Si)

310-M. (German.) **The Tantalum-Silicon System.** Richard Kieffer, Friedrich Benesovsky, Hans Nowotny, and Herbert Schachner. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 242-246.

Melting-point and structure tests, results of which agree with those of X-ray tests made earlier. A temporary phase diagram was set up. Photographs, graphs, tables. 8 ref. (M24, Ta, Si)

311-M. (German.) **Fixed Correlation of Outer Electrons in Crystal Chemistry.** Konrad Schubert. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 254-259.

Assumptions relative to bonding mechanism and the multiple-electron problem as applied to fixed correlations. Experiments showed the outer electrons are also involved in phases of such correlations. Diagrams. 25 ref. (M25)

312-M. (German.) **The Manganese-Indium System.** Siegfried Valentiner. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 259-260.

At 80 atom. % Mn, a maximal magnetic saturation intensity of 12 gauss occurs at room temperature. Curie temperature lies near 300°. These results make probable the existence of Mn_4In. Graphs. 8 ref. (M24, Mn, In)

313-M. (German.) **Micro-Thermo-Analysis, Melting, and Crystallization of Solid Solutions.** A. Kofler. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 21-26.

Behavior of binary system upon formation of a simple eutectic; one or more molecular compounds; miscibility gaps of liquid phases; and solid solutions. Shows homogenization of solid solutions upon heating and cooling within the range between solidus and liquidus. Micrographs. 17 ref. (M24, N12)

314-M. (German.) **Ideal Crystals and Real Crystals.** A. Smekal. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 89-99; disc. p. 99.

Compares both types. Micrographs. (M26)

315-M. (Russian.) **New Method of Making Replicas for Electron Microscopic Examination of the Surface Structure of Metals.** I. Shugar. *Acta Technica Academiae Scientiarum Hungaricae,* v. 5, no. 1, 1952, p. 57-68.

Au and Al were used to prepare replicas of cast iron structures. Method described. (M21, Au, Al, CI)

316-M. (Russian.) **Grain Structure of Metals at High Temperature.** I. A. Oding and M. G. Lozenskii. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 4, Oct. 1, 1952, p. 707-709.

Experimental data on high-temperature metallography. C steel and pure W and Mo were investigated. Micrographs. 5 ref. (M27, Mo, W, CN)

317-M. (Russian.) **Crystallization of Binary Alloys of the Eutectic Type.** Ia. V. Grechnyi. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 5, Oct. 11, 1952, p. 977-980.

Metastable equilibrium and shapes of the solidus curves. Graphs, tables. 4 ref. (M24, N12)

318-M. (Russian.) **Phase Transition When the Thickness of Thin Metallic Films Is Changed.** A. I. Bublik and B. Ia. Pines. *Doklady Akademii Nauk, SSSR,* v. 87, new ser. no. 2, Nov. 11, 1952, p. 215-218.

Electron diffraction patterns for the structure of thin films of Be, V, Cr, Ni and Co. Stabilities of various phases. Photographs, 8 ref. (M27, N6, Be, V, Cr, Ni, Co)

319-M. Determination of the Orientation of Single Crystals of Titanium. A. T. Churchman. *Metallurgia,* v. 48, no. 285, July 1953, p. 50-51.

Method which uses the back reflection Laue technique. Tables. 7 ref. (M26, M22, Ti)

320-M. Constitution Diagram of the Copper-Zirconium Alloy System. Richard Norman Augustson. *U. S. Atomic Energy Commission,* AECD 3456, Dec. 20, 1950, 46 p. Available from OTS,

Dept. of Commerce, Washington, D. C.

Constitution diagram of the Cu-Zr alloy system in the Zr-rich region and hardness properties of the alloys prepared. Photographs, tables, diagram, graph. 19 ref. (M24, Q29, Zr, Cu)

321-M. (English.) **The Probability Distribution of the Magnitude of a Structure Factor. I. The Centrosymmetric Crystal. II. The Non-Centrosymmetric Crystal.** J. Karle and H. Hauptman. *Acta Crystallographica,* v. 6, pt. 2, Feb. 1953, p. 131-141.

General formula derived as a function of the indices h, k and l. Distributions and averages for any power (F) may be obtained by routine mathematics. Examples are given. (M26)

322-M. (French.) **Formation of Alloys of the Al-Cu System by Evaporation of Pure Constituents in a Vacuum.** Pierre Michel. *Comptes rendus,* v. 236, no. 8, Feb. 23, 1953, p. 820-824.

Experimentally determined lattice constants for Cu_3Al, Cu_2O, and Cu_9Al_4 are compared with calculated values. Tables. (M26, N16, Al, Cu)

323-M. (French.) **Micrographic Investigation of the Structure of γ Iron by the Formation of a Layer of Oxides at Its Surface.** Jean Bardolle. *Comptes rendus,* v. 236, no. 18, May 4, 1953, p. 1790-1791.

Existence of true oxide grains whose surface densities and alignments vary from one crystal to another. Micrographs. (M23, Fe)

324-M. (French.) **The Emission Electron Microscope. Its Application to Metallurgical Research.** Albert Septier. *Revue de Métallurgie,* v. 50, no. 3, Mar. 1953, p. 208-214; disc., p. 214.

Principles of operation and examples of applications to metallurgical research. Diagrams, photographs. (M21)

325-M. (French.) **Electronic Theory of Metals.** Genevieve Sutra. *Comptes rendus,* v. 236, no. 25, June 22, 1953, p. 2391-2393.

Problem for AlCu, $AlCu_2$ and Cu_2Zn_3 in liquid and solid states. Graphs. (M25, Al, Cu, Zn)

326-M. (German.) **Difference in the Structures of Chromium Deposits Precipitated From Hydrofluoric-Acid, Fluosilicic-Acid, or Sulfuric Acid Electrolytic Baths.** R. Bilfinger. *Chemische Technik,* v. 5, no. 5, May 1953, p. 261-265.

Graph, photographs. (M27, Cr)

327-M. (German.) **Modern Methods of Microscopic Examination of Metallic Surfaces.** F. Gabler. *Metall,* v. 7, nos. 11/12, June 1953, p. 401-405.

Physical principles of light-field metallography. Dark-field and phase-contrast processes are considered. Photographs, diagrams. 25 ref. (M21, ST)

328-M. (French.) **Preparation and Chemical Anisotropy of Spherical Tin Monocrystals.** Giampaolo Bolognesi. *Comptes rendus,* v. 236, no. 25, June 22, 1953, p. 2414-2416.

Use of acids and KNO_3 to selectively etch the crystal on certain crystallographic planes. (M26, Sn)

329-M. (Swedish.) **Determination of Coarse Nonmetallic Inclusions in High Carbon Steel.** Govert Helmer. *Jernkontorets Annaler,* v. 137, no. 4, 1953, p. 128-139.

Amount of coarse slag inclusions can be approximately estimated in a modified stepdown turning test. Graphs, photographs, tables. (M28, CN)

330-M. An Electron Diffraction Study of the Surfaces of Fe-Ni Binary System Alloys. Tadayuki Nakayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 66-67.

Graph, table. (M22, Fe, Ni)

331-M. Oxide Film on Nickel-Chromium Alloys. Crystal Structure Studies. Earl A. Gulbransen and William R. McMillan. *Industrial and Engineering Chemistry,* v. 45, Aug. 1953, p. 1734-1744.

Influence of composition and crystal structure on resistance to oxidation. Electron diffraction techniques used to study eight alloys containing Mn, Si, Fe, Zr, Ca, Mg, and Al. Photographs, diagrams, tables. 30 ref.

(M26, R2, Ni, Mn, Cr, Si, Fe, Zr, Co, Mg, Al)

332-M. Mounting Metallurgical Specimens. P. A. Lovett. *Metal Industry,* v. 83, July 24, 1953, p. 70.

Procedure for cold curing plastic as mounting medium. (M21)

333-M. "Equilibrium Segregation" at Grain Boundaries. *Metal Industry,* v. 83, Aug. 21, 1953, p. 144.

Factors affecting equilibrium segregation. (M27)

334-M. (French.) **Development of a Submicroscopic Precipitation in Hardenable Nickel-Chrome Type 80-20 Alloys.** Yves Baillie and Jean Pouilgnier. *Comptes rendus,* v. 237, no. 2, July 15, 1953, p. 181-183.

Replica technique for use with the electron microscope to study precipitate formation in Ni-Cr alloys containing Al or Ti. Graphs, micrographs. 5 ref. (M21, Cr, Ni)

335-M. (German.) **An Imprint Method of Viewing Rough Surfaces Under the Electron Microscope.** Hermann Pfisterer. *Naturwissenschaften,* v. 40, no. 3, 1953, p. 106.

Method. Electron micrographs. 4 ref. (M21)

336-M. (German.) Research on the Phase Structures of Cu_2Te, CuTe, Cu_3Sb, InTe, Bi_2Se_3, Pd_5Sb_2, and Pd_5Bi_3 Alloys. K. Schubert, K. Anderko, M. Kluge, H. Beeskow, M. Ilschner, E. Dörre, and P. Esslinger. *Naturwissenschaften,* v. 40, no. 9, 1953, p. 269.

Brief review. 14 ref.
(M26, Cu, Te, Sb, In, Bi, Se, Pb)

337-M. (German.) Correlation of the Position of the Outer Electrons in the Chemistry of Crystals. K. Schubert. *Naturwissenschaften,* v. 40, no. 9, 1953, p. 269-270.

Theoretical discussion. 5 ref.
(M25, Fe, Ni, Al)

338-M. (German.) Chromium Oxides Between Cr_2O_3 and CrO_3. O. Glemser, U. Hauschild, and F. Trüpel. *Naturwissenschaften,* v. 40, no. 11, 1953, p. 317.

Experimental data. 7 ref.
(M26, Cr)

339-M. How Crystal Structure Affects Metal Forming. Samuel Storchheim. *American Machinist,* v. 97, Sept. 28, 1953, p. 139-147.

Crystallography of metals and effects of deformation on the crystal structure. Diagrams, graphs.
(M26, Q24)

340-M. Report of Committee E-4 on Metallography. L. L. Wyman, chairman. *American Society for Testing Materials,* Preprint no. 57, 1953, 28 p.

Activities of subcommittees and techniques for ferrous electron microscopy. Micrographs. (M21, Fe)

341-M. The Adaptation of an Electron Microscope for Reflexion and Some Observations on Image Formation. M. E. Haine and W. Hirst. *British Journal of Applied Physics,* v. 4, Aug. 1953, p. 239-244.

Based on a paper presented to a Conference of the Electron Microscope Group of the Institute of Physics, Bristol, September 1952. Modified mechanical stage arrangements which allow the type E.M.3 electron microscope to be used for the glancing angle "reflexion" technique. Diagrams, micrographs. 8 ref. (M21)

342-M. Structural Features of Oxide Coatings on Aluminum. F. Keller, M. S. Hunter, and D. L. Robinson. *Electrochemical Society, Journal,* v. 100, Sept. 1953, p. 411-419.

Investigations made with an electron microscope. Micrographs, graphs. 6 ref. (M21, L14, Al)

343-M. The Constitution of Aluminium-Copper-Silicon Alloys. H. W. L. Phillips. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 9-15.

Tables, graphs. 16 ref.
(M24, Al, Cu, Si)

344-M. The Structure and Mechanical Properties of Copper-Manganese-Tin Alloys. J. C. Blade and J. W. Cuthbertson. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 17-24.

Tables, graphs. 14 ref.
(M27, Q general, Cu, Mn, Sn)

345-M. The Behaviour of the Crystal Boundaries of Aluminium at Temperatures Near the Melting Point. W. I. Pumphrey and J. V. Lyons. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 33-37.

Tensile strength of high-purity Al was observed to drop sharply some 4° C. below melting point. Experimental techniques employed to determine reasons for phenomena. Graph, diagrams, table. 15 ref.
(M27, Q23, Al)

346-M. The Re-Investigation of a Nickel-Titanium Alloy and Observations on $\beta/(\alpha+\beta)$ Boundaries in Titanium Systems. A. D. McQuillan. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 47-48.

9 references. (M24, Ni, Ti)

347-M. The Preparation in Sheet Form of Large Single Crystals of Silicon-Iron of Predetermined Orientation for Magnetic Purposes. R. G. Martindale and D. A. Langford. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. 2, Aug. 1953, p. 417-424; disc., p. 424-426.

Preparation, apparatus and examination of the crystals. Diagrams, graphs. 36 ref. (M26, P16, Si, Fe)

348-M. Influence of Oxygen on the Properties of Iron and Steel. Taiichi Saito. *Japan Science Review, Engineering Sciences,* v. 2, Apr. 1952, p. 349-360.

Grain size and hardenability determined on samples having closely controlled C and O contents. Diagrams, micrographs, table. 10 ref.
(M27, J26, CN)

349-M. Metallic Grating Replicas as Internal Standards for Calibrating Electron Microscopes. S. R. Rouze and John H. L. Watson. *Journal of Applied Physics,* v. 24, Sept. 1953, p. 1106-1109.

Advantages and limitations of all-metal replicas. Tables, photographs.
(M21)

350-M. Crystallographic Angles for Orthorhombic (Alpha) Uranium. R. B. Russell. *Journal of Metals,* v. 5, sec. 2, Sept. 1953. *American Institute of Mining and Metallurgical Engi-*

neers, Transactions, v. 197, 1953, p. 1190.

Brief description. (M26, U)

351-M. Structure of the Phase TiMn and the Indexing of Powder Patterns of Sigma-Type Phases. R. P. Elliott and W. Rostoker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1203-1204.

Investigation. Tables. (M26, Ti, Mn)

352-M. The Ternary System Ti-Ta-C. John G. McMullin and John T. Norton. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1205-1208.

An 1820° C. isothermal cross section of the Ti-Ta-C ternary diagram was prepared from X-ray diffraction and metallographic data. Diagram. 13 ref. (M24, M21, Ti, Ta)

353-M. System Titanium-Chromium-Iron. R. J. Van Thyne, H. D. Kessler, and M. Hansen. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1209-1216.

Phase diagram of the Ti-rich portion of the system Ti-Cr-Fe to 70% Ti was established by means of isothermal sections at 900, 800, 750, 700, 650, 600, and 550° C., using arc-cast alloys. Diagrams, graphs, tables, micrographs. 14 ref. (M24, Ti, Cr, Fe)

354-M. Decay of Lattice Defects Frozen Into an Alloy by Quenching. A. E. Roswell and A. S. Nowick. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1259-1266.

How measurements of atomic mobility in a Ag-Zn substitutional solid solution make possible a study of the rate of decay of lattice defects frozen into the alloy by quenching. Graphs. 14 ref. (M26, Ag, Zn)

355-M. An Optical Goniometer for the Examination of Long Metal Single Crystals. A. J. Goss. *Journal of Scientific Instruments,* v. 30, Aug. 1953, p. 283-285.

Mechanical construction and optical arrangement. Method of determinating orientation from the etching pit reflection patterns. Practical information regarding etchants and crystallographic data. Diagrams. 13 ref. (M23)

356-M. Electron Diffraction. A. E. Williams. *Mechanical World and Engineering Record,* v. 133, Sept. 1953, p. 390-394.

Equipment and operation. Typical applications in minerals and metals. Photographs, diagrams. (M22)

357-M. Multiplicity in X-Ray Emission Spectra. I. B. Borovsky and T. M. Golovner. *National Science Foundation Translation,* no. NSF-tr-7, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 233.

Composition of complex X-ray spectra of rare earth elements. Tables. (M22, EG-g)

358-M. Certain Regularities in Nuclear Spin and a Nuclear Shell Model. I. A. Vaisman. *National Science Foundation Translation,* no. NSF-tr-16, May 1953, 8 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 237.

Compares Elsasser model with experimental values. Shell models, nuclear spins and orbital momenta for 93 elements. Table. (M25)

359-M. The Thermal Etching of Uranium. B. W. Mott and J. Williams. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 841-844.

Thermal etching characteristics of U with particular reference to the formation of steps on beads of metal produced by melting the powder. (M21, U)

360-M. The Valency of the Transition Metals in Some Binary and Ternary Alloys. H. Jones. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 907-912.

Changes of valency of transition metal atoms in different alloy systems is considered. Reasons for expecting the valency to decrease as conduction band increases. Rough agreement with the experimental results of Haworth and Hume-Rothery for Mn, Fe, and Co. Suggestions for apparent fractional valency of Ni. (M24, Mn, Fe, Co, Ni)

361-M. The Electronic Structure of Transition Metals in Alloys. B. R. Coles. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 915-916.

A review. (M25)

362-M. X-Ray Diffraction Proves Valuable Research and Production Tool to Evaluate Properties of Metals. Gustav Albrecht. *Western Metals,* v. 11, Sept. 1953, p. 74-76.

Complex crystal systems in alloys. Correlates fatigue with changes in these systems and follows microstructure modifications brought about in metals by heat treatment, work hardening and other physical processes. Photographs, diagrams, graphs. (M22)

363-M. (English.) On the System Manganese-Tellurium. S. Furberg.

Acta Chemica Scandinavica, v. 7, no. 4, 1953, p. 693-694.

Results of X-ray studies. 7 ref. (M24, Mn, Te)

364-M. (French.) **Existence of a Short Range Order in Solid Solutions. Study of Aluminum-Silver Alloys.** Gérard Fournet. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 75-77.

Theoretical predictions of X-ray diffraction intensity at various temperatures is in good agreement with experiments. Graph. (M26, Al, Ag)

365-M. (French.) **Obtaining Electron Micrographs of Surfaces Bombarded by Ions.** Albert Septier. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 231-233.

Secondary emission of electrons used to obtain a very slightly enlarged electron picture. Diagrams, micrograph. (M21)

366-M. (French.) **Micrographic Aspect of Polygonization in Uranium.** Marcel L. Englander and Pierre A. Jacquet. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 262-264.

Strictly controlled oxidation permitted detection of a substructure in some U grains after electrolytic polishing. Micrographs. 10 ref. (M27, U)

367-M. (French.) **Electronic Diffraction Study of Vacuum Vaporization of Aluminum-Copper Alloys.** Noboru Takahashi, Jean-Jacquets Trillat, and Adrien Saulnier. *Metaux, Corrosion—Industries,* v. 28, no. 333, May 1953, p. 185-202.

Method permits continuous recording of transformations produced under action of various factors. Tables, graphs, microphotographs, diagrams. 9 ref. (M22, Al, Cu)

368-M. (French.) **Study of the Cold Working of Metals by X-Ray Microdiffraction.** P. B. Hirsch. *Revue de métallurgie,* v. 50, no. 5, May 1953, p. 333-340.

Tables, graphs, diagrams, micrographs. 15 ref. (M22, Au, Cu, Fe, Al, Sn, Pb, Zn)

369-M. (French.) **Observations on the Crystallographic Habit Plane of Martensite.** Robert F. Mehl and D. M. van Winkle. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 465-475.

Relations between the orientation of martensite and austenite. Tables, graphs, micrographs. 11 ref. (M26, AY)

370-M. (German.) **Measurement of Ideal Crystal Lattices.** Adolf G. Smekal. *Acta Physica Austriaca,* v. 7, no. 3, July 1953, p. 324-333.

Highly symmetrical substances of sufficient purity possess measurable ideal lattice areas. Photographs. 26 ref. (M26)

371-M. (German.) **Structure of Amorphous Antimony.** H. Richter and G. Breitling. *Naturwissenschaften,* v. 40, no. 13, 1953, p. 361-362.

Study of lattice-type layering and chain structure of amorphous Sb. Graphs. (M26, Sb)

372-M. (German.) **Crystal Structure of Pd_2Si, Pd_2Ge, and Pt_2Ge.** Kurt Anderko and Konrad Schubert. *Zeitchrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 307-312.

Structures were found to be of the Fe_2P(C22) type. Assumptions regarding an electron lattice of low-potential energy and composed of hexagonal layers are based on local correlation of valence electrons. Diagrams, graphs, tables. 24 ref. (M26, Pd, Pt, Si, Ge)

373-M. (German.) **Gold-Manganese Alloys.** Ernst Raub, Ulrich Zwicker and H. Baur. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 312-319.

Phase diagram for Au-Mn based on thermal, microscopic, X-ray and dilatometric tests. Photographs, graphs, tables. 5 ref. (M24, Au, Mn)

374-M. (German.) **MicroAutoradiography as an Agent for Materials Testing. II.** Joachim Rasch. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 321-322.

Use to establish phase relations in alloys. Photographs. 2 ref. (M23, Au, Pt)

375-M. (German.) **The Tin-Bismuth-Antimony System.** Rudolf Vogel. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 323-324.

Survey of structure. Graphs. (M24, Sn, Bi, Sb)

376-M. (German.) **Reflection Spectra of Powders.** Gustav Kortüm and Peter Haug. *Zeitschrift für Naturforschung,* v. 8a, no. 6, June 1953, p. 372-379.

Validity range of Lambert's cosine law, polarization of diffused radiation, utility of different comparison standards and effect of grain size on the spectra in diffused radiation. Graphs. 19 ref. (M22)

377-M. (Italian.) **Knoop Microhardness Measurements on Some Structural Constituents of Aluminum Alloys.** D. Gualandi and M. Paganelli. *Alluminio,* v. 22, no. 2, 1953, p. 152-165.

Studies of the influence on microhardness exercised by the state of sample surfaces and by the direction of the crystallographic axes of the constituents. Tables, graphs, micrographs. 23 ref. (M26, Q29, Al)

378-M. (Italian.) **The Preparation of Tin Mono-Crystals and Determination**

of Their Crystallographic Orientation. G. Bolognesi. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 208-211.

A method for preparation of white Sn monocrystals. A bath for the electrolytic polishing of Sn and an electrolytic bath for micrographic etching are described. Diagrams, micrographs. 9 ref. (M21, Sn)

379-M. (Russian.) **Theory of Healing Cracks in Crystals and the Equilibrium Form of the Negative Crystal.** G. G. Lemmlein. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 283-286.

Energy properties of large and small crystals compared. Graph. 8 ref. (M26)

380-M. Measurement of Approximately Cylindrical Particles in Opaque Samples. Robert L. Fullman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1267-1268.

Relationships between average dimensions measured on a polished cross section and spatial dimensions of particles dispersed as uniform cylinders. Establishes equations for quantitative investigation of microstructures. (M27)

381-M. Thermal Fatigue of Single Crystals of Aluminum. V. I. Arkharov, S. I. Ignatyeva, and Yu. D. Kozmanov. *National Science Foundation Translation,* no. NSF-tr-3, June 1953, 2 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 439.

X-ray manifestations of these phenomena indicate the mosaic structure of the monocrystal. (M26, Al)

382-M. Mobility of Interstitial Atoms in a Face-Centered Metal. H. B. Huntington. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1092-1098.

Exponential closed-shell repulsion, electrostatic terms and variation of the electron distribution. Tables, diagram, graph. (M25, Cu)

383-M. (Book.) **Standard X-Ray Diffraction Powder Patterns.** Circular 539. v. I. Howard E. Swanson and Eleanor Tatge. v. II. Howard E. Swanson and Ruth K. Fuyat. 160 p. 1953. U. S. Government Printing Office, Washington 25, D. C. $.90.

Presents patterns made recently for 84 inorganic substances at National Bureau of Standards. Compares the patterns with those found in the ASTM file and in the literature, and recommends them for adoption as standard. (M22)

384-M. (Book.) **The Theory of Metals.** A. H. Wilson. Rev. ed. 2. 352 p. Cambridge University Press, 32 East 57th St., New York 22, N. Y. $8.50.

Discusses the motion of an electron in a perfect crystal lattice; metallic structures; structure of alloys; semi-conductors; thermal and magnetic properties of metals; ferromagnetism; formal theory of conduction; mechanism of conductivity; and application of the variation principle to conduction phenomena. (M26, M27, P11, P15, P16)

385-M. Isothermal Transformation of Titanium-Manganese Alloys. P. D. Frost, W. M. Parris, L. L. Hirsch, J. R. Doig, and C. M. Schwartz. *American Society for Metals, Preprint* no. 7, 1953, 16 p.

Observations on binary Ti alloys containing 2.91, 7.72, and 12.3 wt. % Mn at temperatures between 450 and 650° C. Tables, graphs, micrographs. 5 ref. (M24, Ti, Mn)

386-M. The System Zirconium-Aluminum. D. J. McPherson and M. Hansen. *American Society for Metals, Preprint* no. 13, 1953, 18 p.

Phase diagram for arc-cast and heat treated specimens established by metallographic analyses, X-ray diffraction, incipient melting and thermal analysis studies. Tables, graphs, micrographs. 10 ref. (M24, Zr, Al)

387-M. A Study of the Fe-Fe_2B System. C. C. McBride, J. W. Spretnak, and Rudolph Speiser. *American Society for Metals, Preprint* no. 22, 1953, 22 p.

Solubility of boron in iron determined by equilibrating Fe-Fe_2B sandwiches and analyzing the resultant cores spectrographically for boron. Tables, graphs, micrographs. 12 ref. (M27, S11, Fe, B)

388-M. Equilibrium Structures in Fe-Cr-Mo Alloys. J. G. McMullin, S. F. Reiter, and D. G. Ebeling. *American Society for Metals, Preprint* no. 28, 1953, 8 p.

Isothermal sections of the Fe-Cr-Mo ternary diagram at 1500 and 1650° F. Tables, graphs, micrograph. 10 ref. (M24, Fe, Cr, Mo)

389-M. A Survey of Vanadium Binary Systems. W. Rostoker and A. Yamamoto. *American Society for Metals, Preprint* no. 29, 1953, 26 p.

Pertinent information on terminal solubility limits, identities of intermediate phases, and reactions between intermediate phases and terminal solid solutions of 21 binary systems. Tables, graphs, micrographs. 67 ref. (M24, V)

390-M. Effective Diameter of Solute Atoms in Interstitial Solid Solutions. Rudolph Speiser, J. W. Spretnak, and W. J. Taylor. *American Society for Metals, Preprint* no. 4W, 1953, 6 p.

Formulas derived relating the ob-

served change of lattice parameter in interstitial solid solutions to effective diameter of the solute atom. Table. 10 ref. (M26, Fe, Ti, Zr)

391-M. Progress in Metallurgical Microscopy. B. W. Mott. *Endeavour,* v. 12, July 1953, p. 154-161.

Advances in techniques for investigating surface topography, polarized light and microscopy of hot metal surfaces. Diagrams, micrographs. 41 ref. (M21)

392-M. The Cold Rolled Texture of Titanium. D. N. Williams and D. S. Eppelsheimer. *Journal of Metals,* v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1378-1382.

Specimens examined using the Shulz-Decker Geiger counter technique. Tables, diagrams. 8 ref. (M23, Q24, Ti)

393-M. Interface Area, Edge Length, and Number of Vertices in Crystal Aggregates With Random Nucleation. J. L. Meijering. *Philips Research Reports,* v. 8, Aug. 1953, p. 270-290.

Vertices in "cell model" and "Johnson-Mehl" model. Tables, graphs, diagrams. 10 ref. (M26, N2)

394-M. A Comparison of the Powder Patterns on a Sample of Grain-Orientated Silicon-Iron With Those Obtained on a Single Crystal. L. F. Bates and A. Hart. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 813-818.

New pattern, conditions for appearance and data on domain boundary spacings. Diagram, graph. 4 ref. (M26, Fe, Si)

395-M. A Study of Bitter Figures on the (110) Plane of a Single Crystal of Nickel. L. F. Bates and G. W. Wilson. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 819-822.

Magnetic domain structure of a single crystal of Ni cut so that two easy directions of magnetization lay in the plane of each main surface. Diagram, graph. 6 ref. (M26, P16, Ni)

396-M. A Proposed Structure for Certain Domain Configurations on a Single Crystal of Nickel. G. W. Wilson. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 840-841.

Diagram. 3 ref. (M26, P16, Ni)

397-M. Metallographic Examination of Hot Metal Surfaces. B. W. Mott and S. D. Ford. *Research,* v. 6, Oct. 1953, p. 396-400.

Apparatus for microscopic examination of easily oxidized, refractory metals at temperatures up to 1000° C. Diagram, photograph. 12 ref. (M21, U, Be, Zr)

398-M. (French.) Modification of High Silicon-Aluminum Alloys and the Corresponding Structures. Claude Mascre. *Fonderie,* 1953, no. 19, p. 3556-3563.

Action of P and Na on hypereutectic Al-Si alloys. Micrographs, tables, graphs, diagrams. 6 ref. (M27, Al, Si)

399-M. (German.) Phase Diagram: Iron - Iron Phosphide - Molybdenum Phosphide-Molybdenum. Rudolf Vogel and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 369-374.

Shows existence of an eutectic between Mo and Mo_2P. Molybdenum exhibits stronger affinity for P than does Fe. Graphs, photographs, diagrams. 8 ref. (M24, Fe, Mo)

400-M. (German.) Method and Examples of Application of X-Ray Tensile Testing. A. Schaal. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 7, July 1953, p. 211-217.

Fundamentals of stress measurement by X-ray diffraction and uses for methods described. Photographs, graphs, tables, diagram. 7 ref. (M22, Q27)

401-M. (Swedish.) X-Ray Analysis of Carbides in Molybdenum Steel. Kehsin Kuo. *Jernkontorets Annaler,* v. 137, no. 5, 1953, p. 141-148.

Discovery of new Fe-Mo double carbide in steels of 1 to 5% Mo. Carbide reactions and phases in equilibrium at 700° C. Tables, diagrams. 17 ref. (M26, M22, AY)

402-M. (Swedish.) X-Ray and Chemical Analysis of Carbides in Chromium Steel. Kehsin Kuo. *Jernkontorets Annaler,* v. 137, no. 5, 1953, p. 149-156.

Equilibrium diagram for the Fe-Cr-C system below A_1. Reports presence of alpha-Fe, Fe_3C, Cr_7C_3, and $Cr_{23}C_6$. Carbide reactions. Graphs, tables. 21 ref. (M26, M24, AY)

403-M. Application of New Etchants for Delineation of Fine Structure in Steel. A. E. Austin. *American Society for Testing Materials, Preprint* no. 94b, 1953, 5 p.

Comparison of structures of pearlite, bainite and tempered martensite as revealed by various etchants. Micrographs. (M21, ST)

404-M. Positive Versus Negative Plastic Replicas. C. M. Schwartz. *American Society for Testing Materials, Preprint* no. 94c, 1953, 5 p.

Compares the two methods; experimental work on electron microscopy. Micrographs. (M21)

405-M. Techniques for the Study of Precipitated Carbides. W. D. Forgeng and John L. Lamont. *American Society for Testing Materials, Preprint* no. 94d, 1953, 17 p.

Polyvinyl formal method and its modifications. Micrographs. 8 ref. (M21, SS, CN)

406-M. An Introduction to the Electron Theory of Metals. Robert A. Lefever. *Journal of Chemical Education,* c. 30, Oct. 1953, p. 486-490.

General background for understanding metal physics as well as a basis for more advanced study. Diagrams. 14 ref. (M25)

407-M. Alloying Characteristics of Magnesium. John Alico. *Light Metal Age,* v. 11, Oct. 1953, p. 16-17, 24, 26.

Structure of magnesium crystal lattice as it applies to properties of its alloys. Graph, table. (M26, P general, Mg)

408-M. Fractographic Patterns of Segregation. Carl A. Zapffe. *Metallurgia,* v. 48, no. 287, Sept. 1953, p. 130-132.

Fractographic patterns in Zn-Al and Bi-Sb alloys. Micrographs. 6 ref. (M23, In, Bi, Al)

409-M. Color Shows Up the Unknown in Metallography. J. H. Powers and W. J. Loach. *Steel,* v. 133, Oct. 15, 1953, p. 93-96.

Heat tinting as key to color examination of carbide mixtures; reports each constituent and phase can be identified; and new methods for studying structure-property relationship. Photographs. (M23)

410-M. (French.) **Polygonized State of a Metal.** A. Guinier. *Metaux, Corrosion-Industries,* v. 28, no. 337, Sept. 1953, p. 339-347.

Polygonization as a metastable state preceding recrystallization. Diagrams, micrographs. 14 ref. (M26, N5, Al, Zn, Cu)

411-M. (German.) **Effect of Microstructure of Unalloyed Steels on Their Workability.** O. Szabo. *Acta Technica Academiae Scientiarum Hungaricae,* v. 6, nos. 3-4, 1953, p. 351-386.

Effect of carbide distribution on strength, workability and hardenability. Tables, graphs, micrographs, photographs. 14 ref. (M27, J26, Q23, CN)

412-M. (German.) **Structure of the Zirconium-Silicon System.** H. Schachner, H. Nowotny, and R. Machenschalk. *Monatshefte für Chemie,* v. 84, no. 4, 1953, p. 677-685.

X-ray studies revealed presence of $ZrSi_2$, ZrSi, Zr_5Si_3, and Zr_2Si. Tables. 14 ref. (M24, Zr, Si)

413-M. (German.) **X-Ray Investigations of the Platinum-Mercury System.** E. Bauer, H. Nowotny, and A. Stempfl. *Monatshefte für Chemie,* v. 84, no. 4, Aug. 1953, p. 692-700.

Phases were radiographically investigated over entire concentration range. Tables. 10 ref. (M24, Pt, Hg)

414-M. (German.) **Electron Diffraction on Metal Monocrystals up to 1000° C.** Chr. Menzel-Kopp and E. Menzel. *Zeitschrift für Naturforschung,* v. 8a, no. 8, Aug. 1953, p. 499-501.

Research arrangement which permits rapid sequence of heating and observation intervals. 11 ref. (M22, Mo, Au, Cu)

415-M. (Russian.) **Structure of Martensite Crystals of Hardened Steel.** M. P. Arbuzov, L. I. Lvsak, and E. G. Nesterenko. *Doklady Akademii Nauk SSSR,* v. 90, no. 3, May 21, 1953, p. 375-377.

X-ray diffraction used to study size and distortions of structural units. Tables, graph. 6 ref. (M22, M26, CN)

416-M. Fast Polishing Method Brings Out Graphite. R. W. Lindsay and J. M. Snook. *American Foundryman,* v. 24, Nov. 1953, p. 48-50.

Cutting specimen, grinding, first and second wet polishing operations and preparation of the chromic oxide abrasive. Micrographs. (M21, CI)

417-M. Modification of High-Silicon Aluminum Alloys and the Corresponding Structures. Claude Mascre. *Institute of British Foundrymen, Paper no.* 1071, 1953, 6 p.

Action of phosphorus and sodium on the structure of hypereutectic aluminum and silicon alloys. Micrographs, diagrams. 6 ref. (M27, Al, Si)

418-M. Recommended Techniques for Polishing Titanium for Metallographic Examination. Roman Osadchuk, William P. Koster and John F. Kahles. *Metal Progress,* v. 64, Oct. 1953, p. 129-131, 236, 240.

Mechanical and electrolytic techniques. (M21, Ti)

419-M. (English.) **A Study of Deformed and Recovered Aluminum Crystals by a New X-Ray Technique.** C. A. Julien and B. D. Cullity. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 588-597.

Method of detecting and measuring torsional strain in a crystal lattice. Plastic deformation was found to be inhomogeneous and reversible in aluminum single crystals. Diagrams, photographs. 13 ref. (M26, Q24, Al)

420-M. (English.) **On a Statement by C. S. Smith Concerning an Upper Limit to the Sharing of Corners in Aggregates.** J. L. Meijering. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 607.

Author reasons that the ratio of corners to number of crystals can be more than six. (M26)

421-M. (English.) **The High Temperature Hexagonal Phase of Cobalt.** A.

G. Metcalfe. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 609-610.

Previously published data used to indicate that grain size may be very significant in transformation studies. Graph. 6 ref. (M27, N6, Co)

422-M. (English.) **A "Sub-Regular" Solution Model Applied to the Immiscibility Curve in Liquid Lead-Zinc Alloys.** H. K. Hardy. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 610-611.

Shows that only one empirical constant is required for this calculation. Graphs. 4 ref. (M24, Pb, Zn)

423-M. (English.) **Triple η_2 Carbides and the Atomic Size Factor.** Kehsin Kuo. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 611-612.

Experimental data show the existence of three triple carbides in Ti-Ni-Ta-C, Ti-Co-Ta-C, and Ti-Ni-Nb-C alloys. 4 ref. (M25, M27, Ti)

424-M. (French.) **Recording Methods in Electron Microscopy.** R. Dargent. *Metaux, Corrosion-Industries,* v. 28, nos. 335-336, July-Aug. 1953, p. 285-292.

Various methods, and a method yielding a double record. Micrographs. 12 ref. (M21, Al, Cr)

425-M. (German.) **The Splitting of Dislocations in Metals With Close-Packed Lattices.** A. Seeger and G. Schöck. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 519-530.

Elastic properties of straight dislocation lines and splitting of half-dislocations in closest-packed lattice planes. Numerical results for copper, aluminum and cobalt. Tables. 18 ref. (M26, Cu, Al, Co)

426-M. (German.) **Field Electron Microscopic Observations on Cathodes With Cubic Body-Centered and Cubic Face-Centered Lattice Structure.** H. Birkenshenkel, R. Haefer and P. Mezger. *Acta Physica Austriaca,* v. 7, no. 4, 1953, p. 402-416.

Tungsten-cathode method for investigating Mo, Ta and Ni. Diffraction patterns, diagrams, tables. 18 ref. (M26, M22, Mo, Ta, Ni)

427-M. (German.) **Magnetic Measuring in Metallography.** W. Jellinghaus. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 669-678.

Survey of ferromagnetic crystal types; application of ferromagnetic methods to studying structures, textures and deformation processes; paramagnetic and diamagnetic substances; and measuring devices and processes. Graphs, diagrams. 39 ref. (M23, Q24, P16, Fe, Al, Co, Pt, Ni)

428-M. (German.) **Crystal Structure of Mn_3Ge_5 and Several Ternary Phases With Two Transition Elements.** L. Castelliz. *Monatshefte für Chemie,* v. 84, no. 4, 1953, p. 765-776.

Results of X-ray studies of various binary and ternary alloys of germanium, tin and antimony. Tables. 9 ref. (M26, M22, Ge, Sn, Sb)

429-M. (German.) **Nature and Properties of Grain Boundaries of Polycrystalline Metallic Substances.** Kurt Lücke. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 370-378.

Plasticity and anelasticity. Experimental study of grain-boundary energy. Photographs, graphs, diagrams, tables. 42 ref. (M27, Q22, Fe, Al, Zn)

430-M. (German.) **Recognition of Nickel-Carbon-Magnesium System.** Erich Scheil and Leo Hütter. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 387-389.

System as ternary carbide of cubically face-centered lattice. Occurence of quadruple-phase equilibria. Graphs, micrographs. (M24, Ni, Mg)

431-M. (German.) **The Decomposition of the Hexagonal Aluminum Boride AlB_2.** Franz Lihl and Peter Jenitschek. *Zeitschrift für Metallkunde,* v. 44, no. 9, Sept. 1953, p. 414-417.

Method of preparing aluminum-boron alloys, metallographic study of aluminum-boron alloys with aluminum boride inclusions, and X-ray study of aluminum boride decomposition and its effect on the alloys. Micrographs. 7 ref. (M27, Al, B)

432-M. (German.) **Nature and Properties of the Grain Boundaries of Polycrystalline Metals. Review of Recent Work.** Kurt Lücke. *Zeitschrift für Metallkunde,* v. 44, no. 9, Sept. 1953, p. 418-426.

General theory of grain boundaries, grain boundary diffusion and some structural peculiarities caused by surface energy. Diagrams, graphs, micrographs. 28 ref. (M27, N3, Ag, Cu)

433-M. (German.) **A Macrostructure of Amorphous Selenium.** Joachim Weber. *Zeitschrift für Naturforschung,* v. 8a, no. 9, Sept. 1953, p. 565-566.

Conditions under which crystalline structures were induced. Diagram, photographs. (M28, M26, Se)

434-M. (Russian.) **Dispersion of X-Rays by Metals in the Region of Very Small Angles.** B. M. Rovinskii and V. M. Genkin. *Doklady Akademii Nauk SSSR,* v. 89, no. 4, Apr. 1953, p. 673-675.

Dispersion by pure metals. Graphs. 6 ref. (M22)

435-M. (Book.) **Alphabetical and Grouped Numerical Index of X-Ray Diffraction Data.** 441 p. 1950. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. (M22)

SECTION N

TRANSFORMATIONS and RESULTING STRUCTURES

1-N. The Nature of Solids. Gregory H. Wannier. *Scientific American,* v. 187, Dec. 1952, p. 39-48.

How theory explaining characteristics of substances in the solid state has led to the development of such practical devices as the transistor. Diagrams. (N general)

2-N. Development of Porosity During Diffusion in Substitutional Solid Solutions. R. W. Balluffi and B. H. Alexander. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1237-1244.

Metallographic study made of diffusion zones present in Cu-α-brass, Cu-Ni, and Au-Ag diffusion couples. Experiments include quantitative study of rate of porosity formation in α-brass during dezincification, study of porosity that develops in sandwich-type diffusion couples, and study of diffusion zone after diffusing metals from vapor phase into solid phase. Micrographs and graphs. (N1, Cu, Ni, Au, Ag)

3-N. The Effect of Cyclotron Bombardment on Self-Diffusion in Silver. R. D. Johnson and A. B. Martin. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1245-1254.

Radioactive-tracer techniques were employed to measure rate of self-diffusion in Ag in polycrystalline and single crystal solvents over a wide range of temperatures, and to investigate effect of bombardment with 10-Mev. protons on this diffusion process. Cyclotron techniques and apparatus. Diagrams, graphs, and tables. (N1, Ag)

4-N. Effect of Quench Ageing on Strain Ageing in Iron. A. H. Cottrell and G. M. Leak. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 301-306.

Effects of C and N_2 on strain aging and quench aging were examined by stress-strain measurements of soft Fe wire. Freshly quenched specimens were found to strain-age five times faster than those quench aged at 120-300° C. Only in the freshly quenched material is C more important than N_2. (N7, ST)

5-N. The Formation of Bainite. T. Ko and S. A. Cottrell. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 307-313.

By studying surface relief during the formation of bainite, it was established that it forms by nucleation and slow coherent growth. A new theory of the mechanism of bainite formation is proposed. It is suggested that the rate of growth is controlled by the rate of C removal. Tables, charts, and photomicrographs. 40 ref. (N8, ST)

6-N. Effect of a Prequench on the Martensite Reaction in Tool Steel. John J. Gilman. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1300-1301.

Recent experiments have shown that the martensite reaction proceeds to a given extent at a higher temperature in austenite formed from an annealed spheroidal structure than it does in austenite formed from tempered martensite. Furthermore, a prequench alters the appearance of the martensite as compared to martensite formed from "virgin" austenite. (N8, TS)

7-N. Relative Diffusion Rates of Zinc and Copper in Alpha Brass. R. W. Balluffi and B. H. Alexander. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1315-1316.

Relative diffusion rates of copper and zinc in brass were measured in a vapor-solid type of couple with which amounts of copper and zinc diffusing past inert Kirkendall markers can be obtained by

means of a few simple experimental measurements. (N1, Cu, Zn)

8-N. Principles Involved in the Formation of Iron Alloys. (Continued.) K. W. Andrews. *Metal Treatment and Drop Forging,* v. 19, Nov. 1952, p. 489-498.

Further empirical relationships are discussed for establishing fundamental principles involved in formation of iron alloys. Application of electronic theory of elements. Graphs and diagrams. 19 ref. (N general, P10, Fe)

9-N. Orientation Studies of Exaggerated Grain Growth in Tungsten. Fred D. Rosi. *Sylvania Technologist,* v. 5, Oct. 1952, p. 82-86.

Studies of tungsten wire doped with alumina were made. Theoretical considerations were advanced on the origin of coarse grains and effect of impurities at grain boundaries. Graphs and diagrams. 21 ref. (N3, W)

10-N. (English.) Crystal Growth and Orientation in Deposits Condensed From the Vapour. D. M. Evans and H. Wilman. *Acta Crystallographica,* v. 5, Nov. 10, 1952, p. 731-738.

Nature of crystal orientation in deposits of Zn, Cd, Sb, Bi, Fe, NaCl, NaF, and PbS, condensed from vapor upon smooth substrates initially at room temperature, is investigated by electron diffraction. Diagrams, graphs and tables. 51 ref. (N15)

11-N. (English.) Crosses Observed in the Electron-Diffraction Pattern of an Orientated CuAu Film. Shiro Ogawa and Denjiro Watanabe. *Acta Crystallographica;* v. 5, Nov. 10, 1952, p. 848-849.

The order-disorder problem of CuAu in the form of a thin film. Diagrams. (N10, Au, Cu)

12-N. (Russian.) The Use of Artificially Radioactive Indicators for the Study of Diffusion and Self-Diffusion Processes in Metals. Self-Diffusion of Cobalt. P. L. Grugin. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 289-292.

Co^{60} was used in this study. Method is described and data are discussed and tabulated. (N1, S19, Co)

13-N. Isothermal Ordering of Cu_3Au at 200° C. E. K. Halteman, G. F. Mechlin, and H. L. Glick. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1205. (N10, Cu, Au)

14-N. Oriented Chemical Growth on Single Crystals of Zinc and Cadmium. L. N. Lucas. *Proceedings of the Royal Society,* ser. A, v. 215, Nov. 25, 1952, p. 162-174.

Contact planes between substrate and oriented overgrowth were found by determining the facets upon which a particular orientation occurs. Clean surfaces of the metallic crystals used were prepared by electrolytic methods. Inner potentials of Zn and ZnO were measured. Micrographs and diagrams. 10 ref. (N12, Zn, Cd)

15-N. Solid Solutions. Classification of the Solubilities of Elements in Iron. I. I. Kornilov. *Iron & Steel,* v. 25, Dec. 1952, p. 517-521. (Translated from *Izvestiia Akademii Nauk SSSR,* Section of Chemical Sciences).

Previously abstracted from the original. See item 35-N, 1950. (N8, Fe)

16-N. Recent Developments in the Metallurgy of Aluminum Piston Alloys With Hypereutectic Silicon Content. Emma Maria Onitsch-Modl. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 325-337.

Tendency of hypereutectic Al-Si piston alloys toward coarse primary solidification and simultaneous segregation was studied. A hypothesis is proposed which may represent a solution of the problem of metallic and nonmetallic additions to light alloys. Tables, charts, and micrographs. 15 ref. (N12, Al)

17-N. Crystal Orientation in Cold-Rolled Silicon-Iron Sheet. I. Gokyu and H. Abe. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 580-590.

Cold-rolling, recrystallization, and coarsening textures of silicon steel were studied by X-ray, magnetic, and etch-pit methods. Photographs and diagrams. (N5, Q24, AY)

18-N. Magnetic Measurements of Age-Hardening of Iron-Molybdenum Alloys. Tokushichi Mishima, Ryukiti R. Hisiguti, and Yasuo Kimura. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 656-667.

Age hardening was studied by measuring hardness, lattice constants, and saturation magnetization. Activation energies for aging were calculated. 17 ref. (N7, Fe, Mo)

19-N. Study on Age-Hardening. Yoshitsugu Mishima. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 668-681.

Data on age hardening fall into two groups; those with an Austin-Rickett exponent of 1 and those with an exponent of 2 or more. Differences are explained. Tables and charts. 24 ref. (N7)

20-N. An Interpretation of the Hysteresis Loops in A_3 and A_4 Transformations of Pure Iron. Kotaro Honda

and Mizuho Sato. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 707-716.

Calculations and theoretical considerations of the effects of internal stresses on A_3 and A_1 transformations. (N6, Fe)

21-N. The Allotropy of Cobalt. A. G. Metcalfe. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress," 1952, p. 717-731.

A transformation at 1119-1145° C was found by dilatometric measurements and confirmed by thermal etching. Allotropic forms are compared and explained. 27 ref. (N6, Co)

22-N. The Influence of Manganese in Solid Solution on the Recrystallization Temperature and Grain Size of Pure Aluminum Sheet. G. Marchand. *Canadian Journal of Technology,* v. 31, Jan. 1953, p. 15-28.

Experimental procedure for determination. 16 ref. (N5, Mn, Al)

23-N. Grain-Refinement and Its Effects in Non-Ferrous Casting Alloys. A. Cibula. *Foundry Trade Journal,* v. 93, Dec. 18, 1952, p. 695-703.

Influence of grain size on casting and mechanical properties of nonferrous casting alloys. Identities and properties of solidification nuclei in some fine-grained alloys. Recent developments in refinement of Al and Cu-base alloys. Graphs and micrographs. 45 ref. (N12, Q general, E25, Al, Cu)

24-N. Solubility and Diffusion Coefficient of Carbon in Nickel. Reaction Rates of Nickel-Carbon Alloys With Barium Oxide. J. J. Lander, H. E. Kern, and A. L. Beach. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1305-1309.

Experimental study. Tables and graphs. (N1, P13, Ni)

25-N. The Diffusion of Antimony in Silver Single Crystals. L. Slifkin, D. Lazarus, and T. Tomizuka. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1405.

Briefly reviews previous work. Graphs. (N1, Sb, Ag)

26-N. Polygonization During Diffusion. R. W. Balluffi. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1407-1408.

Experimental procedure using Cu-Ni and Au-Ag couples. Micrographs. (N1, Cu, Ni, Au, Ag)

27-N. Effect of Impurities on the Self-Diffusion of Silver. R. E. Hoffman and D. Turnbull. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1409-1410.

Experimental techniques. Graphs. (N1, Ag)

28-N. A Study of Order-Disorder and Precipitation Phenomena in Nickel-Chromium Alloys. *Journal of the Institute of Metals,* v. 20, Dec. 1952, p. 169-180.

Electrical resistivity, specific heat, and X-ray measurements were made on Ni_3Cr and $Ni_{13}Cr_4Al$. Both alloys undergo order-disorder transformations at approximately the same temperature. An additional high-temperature transformation occurs in ternary alloys, consistent with precipitation and re-solution of a second phase. Graphs. 26 ref. (N10, N7, Ni, Cr)

29-N. The Effect of Certain Solute Elements on the Recrystallization of Copper. V. A. Phillips and Arthur Phillips. *Journal of the Institute of Metals,* v. 20, Dec. 1952, p. 185-208.

Activation energies were calculated from hardness results on pure Cu and binary alloys containing small amounts of P, Ag, Cd, As, Te, and Cr. Approximate measurements were made of growth and nucleation rates. Tables, graphs, and micrographs. 23 ref. (N5, N2, N3, Cu)

30-N. Grain Refinement of Titanium. H. P. Leighly and H. L. Walker. *Metal Progress,* v. 62, Dec. 1952, p. 116, 118.

Brief discussion. Micrographs. (N3, Ti)

31-N. The Effect of Mechanical Deformation on the Growth of Cadmium Iodide Crystals From Solution. A. Korndorffer, H. Rahbek, and F. S. A. Sultan. *Philosophical Magazine,* v. 43, Dec. 1952, p. 1301-1306.

CdI_2 crystals were used to study general growth phenomena. Slip processes may account for spiral nature of crystal growth. (N12)

32-N. (French.) Contribution to the Study of Austenite Stabilization. J. Plateau, J. Duflot, and C. Crussard. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 815-833; disc., p. 834.

A study was made using two high-carbon steels. Stabilization apparently is caused by internal stresses. Micrographs, tables, and diagrams. 15 ref. (N8, CN)

33-N. Some Recent Ideas on Recovery and Recrystallization. J. A. Ramsay. *Australasian Engineer,* Nov. 7, 1952, p. 58-62.

Main features of recovery and recrystallization with particular emphasis paid to structural changes occurring prior to recrystallization. Relationship of the latter to the formation of recrystallization nuclei. Diagrams and micrographs. 27 ref. (N4, N5)

34-N. Microsegregation in the Lead-Antimony Alloys. A. C. Simon and E.

L. Jones. *Journal of the Electrochemical Society,* v. 100, Jan. 1953, p. 1-10.

Freezing process occurring in Pb and hypo-eutectic Pb-Sb alloys was studied in single crystals and polycrystalline aggregates by examination of metallographic structure with microscopic, microradiographic, and chemical replica techniques. Causes and extent of microsegregation. Graphs and micrographs. 11 ref. (N12, Pb, Sb)

35-N. On the Stabilization of Austenite With Respect to the Martensite Transformation. G. N. Bogacheva and V. D. Sadovskii. Henry Brutcher Translation 2905, 8 pages.

Previously abstracted from original in *Doklady Akademii Nauk SSSR.* See item 204-N, 1952. (N8, AY, SS, Fe)

36-N. Surface Impregnation of Steel With Molybdenum From a Gaseous Medium. G. N. Dubinin. Henry Brutcher Translation 2942, 8 pages.

Previously abstracted from original in *Doklady Akademii Nauk SSSR.* See item 278-N, 1952. (N1, M24, Fe, Mo)

37-N. (German.) **Aluminum and Gas.** Hans Kostron. *Zeitschrift für Metallkunde,* v. 43, Nov. 1952, p. 373-387.

Reactions of H_2 with Al and its alloys. Micrographs and graphs. 101 ref. (N1, Al)

38-N. (Portuguese.) **The Phenomenon of Diffusion.** Luiz C. Correa da Silva. *ABM Boletim da Associacao Brasileira de Metais,* v. 8, July 1952, p. 234-250.

Occurrence during heat treatment and during solidification of alloys; various mechanisms which explain movement of atoms in crystal lattices; laws governing diffusion; and experimental observations clarifying the problem. Graphs and diagrams. 13 ref. (N1, N12, J general)

39-N. A Prismatic Substructure Formed During Solidification of Metals. J. W. Rutter and B. Chalmers. *Canadian Journal of Physics,* v. 31, Jan. 1953, p. 15-39.

Single crystals of Sn grown from melt under a wide range of conditions are shown to exhibit a fibrous structure which manifests itself as parallel ridges on free surface of specimen and as a hexagonal network on growing solid-liquid interface. Theory is advanced which accounts for origin and observed properties of structure. Graphs, diagrams, and micrographs. 11 ref. (N12, Sn)

40-N. The Preparation of Single Crystals and Bicrystals by the Controlled Solidification of Molten Metals. Bruce Chalmers. *Canadian Journal of Physics,* v. 31, Jan. 1953, p. 132-146.

Methods that were developed for production of single crystals and bicrystals of a wide variety of metals by controlled freezing of molten metal in a horizontal "boat". Orientations are controlled by "seeding" technique. Technique is applied to Ni, Cu, Au, Ag, Al, Zn, Pb, Sn, and In. Graphs and diagrams. 8 ref. (N12)

41-N. The Effect of Minor Additions on the Age-Hardening Properties of a High-Purity Lead-Antimony Alloy. L. M. T. Hopkin and C. J. Thwaites. *Journal of the Institute of Metals,* v. 81, Jan. 1953, p. 255-260.

Experimental data revealed that little or no age-hardening occurred, after suitable treatments, in 0.85% Sb lead alloy of extreme purity. Graphs and micrographs. (N7, Pb)

42-N. Entropies of Activation in Metallic Diffusion. G. J. Dienes. *Physical Review,* ser. 2, v. 89, Jan. 1, 1953, p. 185-188.

Theoretical examination in which entropy contribution arising from altered vibrational frequencies around saddle point is estimated. Concludes that negative over-all entropies of activation are theoretically permissible and are likely to arise when over-all activation energy is small. 21 ref. (N1, P12)

43-N. Distribution Coefficient of Indium in Germanium on Crystallization. J. J. Dowd and R. L. Rouse. *Proceedings of the Physical Society,* v. 66, sec. B, Jan. 1, 1953, p. 60-61.

Distribution of In impurity in a Ge ingot was measured using radioactive tracer technique. (N12, S19, In, Ge)

44-N. (French.) **Speed of Sound and the Density of the Stages of Thermal Decomposition of Martensite in Steels.** Georges Vidal and Pierre Lescop. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 17, 1952, p. 1221-1223.

Variation of the speed of sound as a function of physical and chemical variations of length during decomposition of martensite was studied. Results are charted. (N8, P10, ST)

45-N. (German.) **Effect of Aging Several Years on Cold-Deformed Soft Open-Hearth Steel.** Hans Jungbluth and Eugen Schmidtmann. *Archiv für das Eisenhüttenwesen,* v. 23, Nov.-Dec. 1952, p. 439-441.

Samples of 0.09% C, 0.16% Si, 0.33% Mn steel, aged 26 years, were compared with unaged steel. No

noteworthy crystallization recovery could be determined even at 75% deformation. X-ray examination also disclosed no significant differences. (N7, CN)

46-N. (German.) **Initiation of Intermediate Transformation of Steel by Small Amounts of Alpha Iron.** Werner Jellinghaus. *Archiv für das Eisenhüttenwesen,* v. 23, Nov.-Dec. 1952, p. 459-470.

Transformation processes of four low alloy steels were studied. Data are tabulated and charted. Photomicrographs. 15 ref. (N8, AY)

47-N. (German.) **Orientation of Crystals After Transformation of Iron.** Helmut Neerfeld. *Archiv für das Eisenhüttenwesen,* v. 233, Nov.-Dec. 1952, p.471-473.

Alpha crystals were found arranged in various patterns. A given arrangement of γ crystals changed to a definite arrangement of α crystals. (N8, Fe)

48-N. (German.) **Report on Recrystallization of Cu-Mn-Ni Alloys.** O. Dahl and K. L. Dreyer. *Metall,* v. 6, Dec. 1952, p. 753-755.

Preliminary studies revealed that very high hardness of such alloys can be achieved by suitable heat treatment, especially in combination with cold deformation. This alloy group may be valuable to industry. Charts and micrographs. 4 ref. (N5, Cu, Mn, Ni)

49-N. Diffusion of Carbon in Austenite. M. E. Blanter. Henry Brutcher, Translation 2263, 14 pages.

Previously abstracted from *Zhurnal Tekhnicheskoi Fiziki.* See item 4b-23, 1948. (N1, N8, CN)

50-N. On the Fundamental Concepts of the Theory of Phase Transformation in Solids. V. I. Arkharov. Henry Brutcher, Translation 2851, 18 pages. *OTN,* 1951, p. 1744-1751.

Reviews recent changes in concepts regarding phase transformations in alloys and, in particular, steel. Analogy made between thermoelastic martensite and elastic twinning in which one true criterion of diffusionless mechanism can be distinguished. Previously abstracted from *Izvestiia Akademii Nauk SSSR.* See item 162-N, 1952. (N general)

51-N. Analysis of Process of Absorption of Gases by Metals. Communication II. Absorption of Hydrogen and Nitrogen by Iron. A. Diiakonov and A. Samarin. Henry Brutcher, Translation 2875, 10 pages. (From *Izvestiia Akademii Nauk SSSR, Otd. Tekh. Nauk,* Jan. 1946, p. 121-126.)

Literature data on solubility of H_2 in Fe plotted as log K_H vs. 1/T, and advantage of this method of plotting. Calculation of heat effect and free-energy changes in solution of H_2 in Fe. Particulars on known nitrides Fe_2N and Fe_4N, and on absorption of N_2 by α, γ, δ, and liquid Fe. (N16, P12, Fe)

52-N. The Transmission of Hydrogen Through Palladium by Electrolysis. H. B. Wahlin and Virgil O. Naumann. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 42-44.

Study of transmission through Pd shows that the area of the surface at which H_2 leaves is the principal controlling factor. Possible applications to hydrogenation studies. Graphs. (N1, Pd)

53-N. Investigation of Crystal Growth by Thermal Etching and Oriented Overgrowth. Alexander Smakula and Myron W. Klein. *Journal of Chemical Physics,* v. 21, Jan. 1953, p. 100-104.

Data on secondary nucleation in single crystals of Tl obtained in connection with annealing. Micrographs. 15 ref. (N2, Tl)

54-N. The Dissociation of H_2 and N_2 on Tungsten Filaments. M. Farber and A. J. Darnell. *Journal of Chemical Physics,* v. 21, Jan. 1953, p. 172-173.

Briefly described. (N15, W)

55-N. Self-Diffusion in the Alkali Metals. D. K. C. MacDonald. *Journal of Chemical Physics,* v. 21, Jan. 1953, p. 177-178.

Brief discussion of measurements using Li, Na, and K. Graphs. 3 ref. (N1, Li, Na, K)

56-N. Aluminum-Oxygen Equilibrium in Liquid Iron. Nev A. Gokcen and John Chipman. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 173-178.

Experimental study was made on equilibrium of liquid Fe containing Al and O_2 with a gaseous mixture of H_2 and water vapor, and with crucibles of pure Al_2O_3 from 1695-1866° C. Graphs and tables. 12 ref. (N12, Fe, Al)

57-N. Low Temperature Aging in Titanium Alloys. W. M. Parris, L. L. Hirsch, and P. D. Frost. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 178-179.

Work which demonstrates that it is possible to introduce large increases in hardness in certain Ti alloys by heating to 200-300° F. Graphs. (N7, Q29, Ti)

58-N. Attainment of Equilibrium in Gas-Metal Reactions. Nev A. Gokcen. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 191-194.

Derives formula expressing minimum time required for establishment of equilibrium and compares calculated values with available data. Graphs and tables. 9 ref. (N16, P12)

59-N. Effect of Carbon on the Volume Fractions and Lattice Parameters of Retained Austenite and Martensite. C. S. Roberts. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 203-204.

Brief description. Graphs. 12 ref. (N8, AY)

60-N. Absolute Rate Theory Applied to Rate of Growth of Pearlite. J. H. Frye, Jr., E. E. Stansbury, and D. L. McElroy. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 219-224.

Rates of growth of pearlite in high-purity Fe-C alloys were measured as a function of transformation temperature. These and other data were correlated in terms of a derived rate equation. Theoretical implications. Tables and graphs. 19 ref. (N8, Fe)

61-N. Allotropy in the Phase $ZrCr_2$. W. Rostoker. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 304.

Specimens of $ZrCr_2$ annealed at 1200, 1100, 994, 900, 834, 800, and 700° C. and subsequently quenched were examined by X-ray diffraction analysis. Tables. (N6, Zr, Cr)

62-N. Occurrence of Chi Phase in Molybdenum-Bearing Stainless Steels. P. K. Koh. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 339-343.

Results of some metallographic and X-ray diffraction studies on chi phase as found in several experimental alloys as well as a few Mo-bearing commercial stainless steels. Micrographs and tables. (N8, SS)

63-N. Diffusion Problems Associated With the Growth of Crystals From Dilute Solution. Alfred Seeger. *Philosophical Magazine,* v. 44, Jan. 1953, p. 1-13.

Theoretical investigation of diffusion problem and supersaturation conditions at crystal surface. Tables and diagrams. 7 ref. (N1)

64-N. (French.) **Age Hardening of Austenitic and Ferritic Stainless Steels.** J. Hochmann. *Revue de Métallurgie,* v. 49, Dec. 1952, p. 849-854.

Reviews age hardening phenomena, particularly of phase precipitation and its effects on mechanical properties and corrosion resistance. (N7, Q general, R general, SS)

65-N. Septum Permeation of Hydrogen From Flames. F. W. Thompson and A. R. Ubbelohde. *Proceedings of the Royal Society,* ser. A, v. 216, Jan. 22, 1953, p. 193-202.

Relative rates of permeation were compared for a $H_2/O_2/N_2$ flame with metal septa consisting of decarburized Cr steel, decarburized Cr/Ni alloy steel, or Ni; and with metal septa consisting of decarburized steel or Ni, when small quantities of SO_2 or H_2S are mixed with $H_2/O_2/N_2$ flame. Diagrams and graphs. (N1, AY, Ni)

66-N. (Pamphlet.) **Research and Development of Vapor Deposited Coating for Titanium and Titanium Alloys.** Mohammed S. Hyder. Sam Tour & Co., Inc., (New York City), P# 2286, R# 9408, Copy No. 56, Apr. 21, 1952, 24 pages.

Experimental data and results. Micrographs. (N15, L25, Ti)

67-N. Crystallization and Heat Transfer in a Stream of Liquid Metal Flowing Along the Surface of a Mould. E. W. Fell. *Proceedings of the General Discussion on Heat Transfer,* Sept. 1951, p. 276-278.

Determines heat transfer in streams of molten metal and in molds, to elucidate solidification process. Temperature distribution in streams of different melts is calculated for laminar or Poiseuille flow for a boundary layer along a flat surface for 2-dimensional motion. Deals with more simple types of motion and not with turbulence. Graphs. (N12, E25)

68-N. The Effect of Added Metallic Impurity and of Closed Moulds on the Growth From the Melt of Single Crystals of Tin. A. J. Goss. *Proceedings of the Physical Society,* v. 66, sec. B, Feb. 1, 1953, p. 65-73.

Experiments on crystallization of binary alloys of tin. 10 ref. (N12, Sn)

69-N. Effect of Lead and Nickel on Grain Size of Certain Cast Copper-Base Alloys. R. A. Colton, F. L. Turk, and D. L. LaVelle. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 605-610; disc., p. 610.

Experiments were conducted to determine qualitatively effect on grain

size of Pb in cast Cu, and Ni in a commonly used Cu-Sn alloy. Experimental method which minimizes cooling rate as a variable was used. (N3, Pb, Ni, Cu)

70-N. Effect of Hydrogen on Graphitization. F. Brown and M. F. Hawkes. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 635-639; disc., p. 639-640.

Reviews previous work and continues with experimental account of α-range graphitization, stable eutectoid reaction, and subcritical graphitization of cementite. Micrographs. 13 ref. (N8, CI)

71-N. The Effect of the Rate of Cooling on the Allotropic Transformation Temperatures of Uranium. Pol Duwez. *Journal of Applied Physics,* v. 24, Feb. 1953, p. 152-156.

Measurement of allotropic transformation temperatures with rates of cooling varying from 5 to 8000° C. per sec. Graphs and tables. 18 ref. (N6, U)

72-N. (French.) **Study of the Order-Disorder Modification in the Cu-Pt Alloys.** Gérard Fournet. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Dec. 1, 1952, p. 1377-1379.

Transition from order to disorder in Cu-Pt alloys takes place without notable redistribution of first neighbors. Good agreement was found with experimental data when it was supposed that difference $W(r_2)$ of energies of similar and dissimilar pairs, with relation to second neighbors was larger than term $W(r_1)$ which corresponds to first neighbors. (N10, Cu, Pt)

73-N. (French.) **A Process for the Study of Reactions Between Gas and Solids. Application to the Iron-Carbon-Hydrogen System.** Louis Beaujard, Gaston Collette, and Léon Jacqué. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Dec. 1, 1952, p. 1388-1390.

Reports on a method for study of equilibrium and rate of reactions at elevated temperatures between solid and gaseous phases. The equilibrium constants calculated by Austin and Day are confirmed. (N15, Fe,)

74-N. (French.) **Rapid Tempering of Steels.** André Henri Michel and Jean Papier. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Dec. 1, 1952, p. 1398-1400.

Decomposition of residual austenite in W18 Cr 4V2 steel at temperatures below 400° C. was studied by various methods. Results are charted. (N8, TS)

75-N. The Diffusion and Solubility of Nitrogen in Beta Zirconium. M. W. Mallett, E. M. Baroody, H. R. Nelson, and C. A. Papp. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 103-106.

Study was made from 900 to 1600° C. at 1 atm. Limiting solubilities of N_2 in β/Zr were determined from diffusion data. Graphs. 8 ref. (N1, Zr)

76-N. Some Applications of the Thermodynamic Theory of Irreversible Processes to Physical Metallurgy. E. S. Machlin. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 437-445.

Extension of thermodynamic theory was made for irreversible growth processes occurring by motion of an interface. Theory is applicable to diffusion; recrystallization; continuous grain growth; growth of carbides; eutectoid products; and in solidification; recovery; "slipless" flow; etc. 19 ref. (N1, N3, N4, N5, N12, P12)

77-N. Decomposition of Austenite in Low Carbon, Ni, Mo, Steel Weld Metal. E. F. Bailey and W. J. Harris, Jr. *Welding Journal,* v. 32, Mar. 1953, p. 134s-138s.

Isothermal decomposition studies including cooling diagrams and microstructures. Micrographs and graphs. (N8, K general, AY)

78-N. Surface Impregnation of Steel With Manganese From a Gaseous Medium. G. N. Dubinin. Henry Brutcher Translation 2943, 9 pages.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 280-N, 1952 (N1, M24, Fe, Mn)

79-N. (German.) **Report on the Question of Crystallization of Cast Iron With Graphite Globules.** A. Wittmoser. *Giesserei,* v. 40, Jan. 8, 1953, p. 8-16.

Theories on formation of graphite globules. Indirect origin from decomposition of cementite, direct origin from the melt, formation from supersaturated mixed crystals, and the influence of C and Si content on their structure. Micrographs. (N12, E25, CI)

80-N. Effects of High-Temperature Heating on the Isothermal Formation of Bainite. S. A. Cottrell and T. Ko. *Journal of the Iron and Steel Institute,* v. 173, Mar. 1953, p. 224-228.

Incubation period is shortened and the rate of transformation is increased in Ni-Cr-Mo steels after austenitizing at high temperature. Graphs and micrographs. 10 ref. (N8, AY)

81-N. Kinetics of the Martensite Transformation Above Room Temperature. G. V. Kurdyumov and O. P. Maksimova. *Metal Progress,* v. 63, Feb. 1953, p. 142, 144.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 105-N, 1952. (N8, AY)

82-N. A Dislocation Mechanism for the Growth of Hopper Crystal Faces and the Growth of Salol Crystals From Solution and From the Melt. S. Amelinckx. *Philosophical Magazine,* v. 44, Mar. 1953, p. 337-339.

Shows how a dislocation mechanism can be devised to account for the occurrence of spiral growth pits. (N12)

83-N. Effect of the Fermi Energy on the Stability of Superlattices. J. F. Nicholas. *Proceedings of the Physical Society,* v. 66, sec. A, Mar. 1953, p. 201-208.

Shows that ordering may cause a significant decrease in the Fermi energy. Application of theory to superlattices in CuPt, CuAu, and Ag_3Mg. 10 ref. (N10)

84-N. A Study of the Order-Disorder Transformation in Iron-Nickel Alloys in the Region $FeNi_3$. R. J. Wakelin and E. L. Yates. *Proceedings of the Physical Society,* v. 66, sec. B, Mar. 1953, p. 221-240.

Transformation was studied by measurements of electrical resistivity, X-ray analysis, and examination of the magnetic properties in both low and high fields. Graphs and tables. 31 ref. (N10, Fe, Ni)

85-N. Effect of Alloying Elements on Grain Boundary Relaxation in Alpha Solid Solutions of Aluminum. C. Dean Starr, E. C. Vicars, A. Goldberg, and J. E. Dorn. *Transactions of the American Society for Metals,* v. 45, 1953, p. 275-285.

Small additions of Zn, Ag, Cu, and Ge that form α solid solutions with Al have no significant effect on resistance to grain-boundary relaxation. Tables and graphs. 4 ref. (N3, Al)

86-N. Effect of Initial Grain Size in the Pearlite-Austenite Transformation. M. I. Maslennikova and Ya. R. Rauzen. Henry Brutcher Translation 2888, 8 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 20, no. 6, 1950, p. 692-697.)

Experimental data obtained on 1.02% C, 1.56% Cr steel. (N8, AY)

87-N. Influence of Manganese Upon Diffusion of Carbon in Austenite. M. E. Blanter. Henry Brutcher Translation 2924, 7 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 21, no. 7, 1951, p. 818-821.)

Experimental study of effect of Mn content, C concentration, and temperature on diffusion constants. (N1, Mn, ST)

88-N. (English.) Theory of Catalysis of Nucleation by Surface Patches. David Turnbull. *Acta Metallurgica,* v. 1, Jan. 1953, p. 8-14.

Multiplicity in crystal nucleation frequency is explained by use of no more than two fundamental nucleation frequencies for a given dispersion at a given temperature. Data are described by plausible distributions of patches with size. Graphs. 12 ref. (N2)

89-N. (English.) Martensite. F. C. Frank. *Acta Metallurgica,* v. 1, Jan. 1953, p. 15-21.

Investigation in which lattice constants of α and γ phases are given to determine natural habit, motions, and resulting orientation when transformation occurs. Diagrams. 8 ref. (N8, M26, Fe)

90-N. (English.) Application of Nucleation Theory to Isothermal Martensite. J. C. Fisher. *Acta Metallurgica,* v. 1, Jan. 1953, p. 32-35.

Previously described extension of classical nucleation theory is shown to agree quantitatively with experimental observations of an Fe-Ni-Mn alloy. Martensite transformation in this alloy is described in terms of nucleation and rapid growth of thin plates. Graphs. (N8, Fe)

91-N. (English.) Thermal Stabilization of Austenite in Iron-Carbon-Nickel Alloys. E. R. Morgan and T. Ko. *Acta Metallurgica,* v. 1, Jan. 1953, p. 36-48.

Thermal stabilization of austenite above and below martensitic transformation during cooling and during isothermal holding was investigated. Graphs. 40 ref. (N8, Fe)

92-N. (English.) Frequency of Annealing Twins in Copper Crystals Grown by Recrystallization. W. G. Burgers, J. C. Meijs, and T. J. Tiedema. *Acta Metallurgica,* v. 1, Jan. 1953, p. 75-78.

Experiments set up to show that frequency of annealing twins in recrystallized metals depends on orientation between growing crystal and matrix texture. Micrographs. 16 ref. (N5, Cu)

93-N. (French.) Existence of Carbide Precipitation During the Aging of Fe-C Alloys by Means of Optical and Electronic Micrographs. H. J. Seemann, D. Hartnagel, and U. Hintz-

peter. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 95-104; disc., p. 104.

Observed transformations are compared with kinetics of the carbide precipitation from αFe-C supersaturated solutions. Micrographs. (N7, AY)

94-N. (German.) **Regarding a Series of Solid Solutions Between Two Ternary Representatives of the C1 Type.** L. Castelliz. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften,* v. 83, Dec. 15, 1952, p. 1314-1317.

Complete miscibility exists between the two C1 phases, NiMnSb and CuMnSb. Lattice constant increases and Curie temperature decreases with an increase of Cu content. Experimental data are included. (N12, Ni, Cu)

95-N. (German.) **Relationship Between Kinetics of Transformation, Structural Formation, and Hardness of Cr-V Steels.** Max Kroneis, Reinhold Gattringer, and Helmut Krainer. *Stahl und Eisen,* v. 73, Jan. 1, 1953, p. 22-30.

Experiments were conducted on two samples to determine how higher hardening temperatures lead to increased hardening of large cross sections. Micrographs and graphs. 15 ref. (N8, J26, Q29, AY)

96-N. (German.) **On the Age-Hardening of Al-Ag Alloys. Part V. Influencing Electrical Conductivity and Thermal Power by Alternating Heat Treatment in the Cold and Hot Hardening Region.** Werner Köster and Hermann Dietrich. **Part VI. Determination of Heats of Re-Formation and Separation.** Werner Köster and Hans Achim Schell. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 449-459.

Includes graphs. (N7, P15, Al, Ag)

97-N. (Spanish.) **A Practical Case of Retained Austenite.** Mario Pujol Roig. *Revista de Ciencia Aplicada,* v. 6, Mar.-Apr. 1952, p. 130-131.

Retention of austenite in a Cr-Ni carburizing steel after heat treatment. Micrographs. (N8, AY)

98-N. (Spanish.) **Formation of Residual Austenite in a Ni-Cr-Mo Case-Hardened Steel.** Justo Ferrer Flotats. *Revista de Ciencia Aplicada,* v. 6, Mar.-Apr. 1952, p. 132-140.

Underlying causes and various influencing factors. Tables, graphs, and micrographs. 8 ref. (N8, AY)

99-N. Formation of Nodular Graphite in Cast Irons. V. A. Altekar. *Colorado School of Mines, Quarterly,* v. 48, Jan. 1953, p. 1-41.

Proves by logic and experimental evidence that nodular graphite is formed by manipulation of the same factors which cause normal graphitization. Tables and micrographs. Bibliography. (N8, CI)

100-N. Effect of Germanium on the Transformation of White to Gray Tin, at Comparatively Low Temperature. R. R. Rogers and J. F. Fydell. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 161-164.

At a comparatively low temperature, gray Sn may appear on white Sn when the latter is in contact with elementary Ge, contains a certain proportion of Ge as an alloy, or is in contact with solutions in which certain Ge compounds are dissolved. The spread rate of gray Sn on white Sn castings and coatings containing various proportions of Ge. Tables. (N6, Sn)

101-N. Growth of Metal Whiskers. S. Eloise Koonce and S. M. Arnold. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 365-366.

Study of filamentary growths which may develop on the surfaces of some metals. (N12, Sn)

102-N. The Preferred Direction in a Magnetically Hardened Permanent Magnet Alloy. M. McCaig. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 366.

Investigation in which columnar disks of Alcomax III were cut so that the columnar axis was along a diameter. Results. 6 ref. (N5, P16, SG-n)

103-N. The Phase Transformation of Cobalt as Observed on Single Crystals. Victor J. Kehrer and Henry Leidheiser, Jr. *Journal of Chemical Physics,* v. 21, Mar. 1953, p. 570.

Preliminary results of experiments. (N6, Co)

104-N. Transformation and Hardenability of Boron Steels. *Metal Progress,* v. 63, Mar. 1953, p. 96-B.

Data sheet. (N8, J26, ST)

105-N. Effect of Deformation on Martensite Transformation. A condensation of "Influence of Deformation on the Kinetics of the Martensitic Transformation", by O. P. Maksimova and A. I. Nikonorova. *Metal Progress,* v. 63, Mar. 1953, p. 140, 142.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 104-N, 1952. (N8, AY)

106-N. Alpha and Eta-Phase Formation in Rapidly Cooled Fe-Mn Alloys. J. Gordon Parr. *Metal Treatment and Drop Forgings,* v. 20, Mar. 1953, p. 139-140, 138.

Qualitative theory is given to ex-

plain formation of α and ε phases in quenched Fe-Mn alloys in terms of nucleation from strain embryos. Tables. 15 ref. (N6, AY)

107-N. Redistribution of Carbon During Transformation in Bainite Range. L. M. Pevzner, G. M. Rovenskii, and T. D. Kubyshkina. Henry Brutcher Translation 2976, 7 pages. (From *Doklady Akademii Nauk SSSR,* v. 85, no. 4, 1952, p. 811-814.)

Experimental study of carbon content of retained austenite in hypoeutectoid steels after isothermal decomposition in bainite range, based on X-ray measurement of lattice constants. Cr-Mn-Si and 2.7% Si steels were used. (N8, AY)

108-N. (English.) **Secondary Recrystallization Textures and Their Origin in Cold-Rolled Single Crystals of Silicon Iron.** C. G. Dunn. *Acta Metallurgica,* v. 1, Mar. 1953, p. 163-175.

Study made of changes in grain size and orientation using metallographic, X-ray, and magnetic torque methods. Graphs, diagrams, and micrographs. 16 ref. (N5, Q24, Fe)

109-N. (English.) **The Preparation of Alpha-Uranium Crystals.** R. W. Cahn. *Acta Metallurgica,* v. 1, Mar. 1953, p. 176-184.

Applications of the strain-anneal and phase-change methods to the growth of alpha-uranium single crystals. Micrographs. 11 ref. (N12)

110-N. (English.) **Stress-Induced Movement of Crystal Boundaries.** Choh Hsien Li, E. H. Edwards, J. Washburn, and E. R. Parker. *Acta Metallurgica,* v. 1, Mar. 1953, p. 223-229.

Investigations on stress-induced movement of small angle boundaries in Zn crystals in the temperature range of 25 to 400 C°. Graphs and micrographs. (N5, Zn)

111-N. (English.) **Anisotropy of Surface Self-Diffusion of Silver.** W. C. Winegard. *Acta Metallurgica,* v. 1, Mar. 1953, p. 230.

Measurement of the diffusion and results obtained. (N1, Ag)

112-N. (English.)**Notes on the Theory of Annealing Textures.** Paul A. Beck. *Acta Metallurgica,* v. 1, Mar. 1953, p. 230-234; disc. p. 234-238.

Shows that the reorientation during annealing can be accounted for on the basis of the orientation dependence of grain boundary mobility. 53 ref. (N5)

113-N. (English.) **The Disordering Reaction in Ni_3Pt.** R. A. Oriani and T. S. Jones. *Acta Metallurgica,* v. 1, Mar. 1953, p. 243.

Experiments to determine the disordering temperature of Ni_3Pt. (N10, Pt, Ni)

114-N. (Book—Russian.) **Phase Transformations in Iron-Carbon Alloys.** I. N. Bogachev and A. A. Popov, editors. 174 pages. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Chapters on crystallization of liquid phases and on diffusion contain fundamental discussions of nucleus formation and crystal growth. Formation and decomposition of austenite; martensite formation, tempering phenomena; and TTT-charts are treated. Isothermal and anisothermal transformation products are compared. (N8, ST)

115-N. Stabilization of the Austenite-Martensite Reaction in a High Chromium Steel. S. C. Das Gupta and B. S. Lement. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 530-536.

Shows that no appreciable stabilization occurs in a 15% Cr, 0.7% C steel unless some martensite is initially present. Graphs and tables. 14 ref. (N8, SS)

116-N. Silver-Cadmium Eutectoid. G. R. Speich and David J. Mack. *Journal of Metals,* v. 5, Apr. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 549-553.

Deals with the eutectoid which occurs at 50.5 wt. % Ag. Transformation of β was studied by isothermal methods. Graphs and micrographs. 10 ref. (N9, Ag, Cd)

117-N. Antimonial Lead Alloys. *Metal Industry,* v. 82, Apr. 3, 1953, p. 268.

Age hardening of pure Pb-Sb alloys. Shows that precipitation of a finely dispersed hard phase does not necessarily cause hardening. (N7, Pb)

118-N. Crystallization of Silicon From a Floating Liquid Zone. Paul H. Keck and Marcel J. E. Golay. *Physical Review,* v. 89, Mar. 15, 1953, p. 1297.

Method for crystallization of Si from the melt without using any crucible material. (N12, Si)

119-N. (English.) **Measurements on the Evolution of Heat During the Recovery of Cold-Worked Metals.** G. Borelius, Stig Berglund, and Sven Sjöberg. *Arkiv För Fysik,* v. 6, no. 2, 1953, p. 143-149.

Measurements made on specimens of cast (Al, Zn) or turned and an-

nealed (Cu) rods of 8-mm diameter. Graphs. (N4, Al, Zn, Cu)

120-N. (German.) **Thermodynamics of Phase Changes. Part I. Heterophase Transitions in Single-Substance Systems.** Günther Porod. *Acta Physica Austriaca,* v. 6, no. 4, 1952, p. 322-328.

Discusses transitions of two phases under different pressures. A simple differential equation was derived. Graphs. (N6)

121-N. (Swedish.) **Changes in Structure and Properties in Connection With Arc Welding of Creep Resistant Chromium-Molybdenum Steels.** Tore Norén. *Jenokontorets Annaler,* v. 136, no. 12, 1952, p. 511-548.

Includes austenite transformation studies based on TTT-diagram and Jominy curves of different heats. These were combined with extensive microscopic examination of welded tubes. (N8, K1, Cr)

122-N. The Kinetics of the Eutectoid Transformation in Zinc-Aluminium Alloys. R. D. Garwood and A. D. Hopkins. *Institute of Metals, Journal,* v. 81, Apr. 1953, p. 407-415.

TTT-diagrams were constructed for a Zn alloy containing 22.5% Al using data obtained in dilatometric, metallographic, and hardness studies. Discusses discrepancies which occur in the times for the completion of the transformation. Graphs. 27 ref. (N9, Zn, Al)

123-N. Diffusion of D_2 From D_2O Through Steel. Francis J. Norton. *Journal of Applied Physics,* v. 24, Apr. 1953, p. 499.

Experiments using heavy water (D_2O) to show that H_2 in H_2O participates in the initial corrosion rather than the H_2 present in the steel. (N1, R4, ST)

124-N. A Special Kind of Growth Structure in Metal Single Crystals. F. Blaha. *Nature,* v. 171, Apr. 11, 1953, p. 650-651.

Growth of single Zn crystals, using a method in which the growth boundaries are examined without etching, in their natural relief by means of a stereomicroscope. (N12, M23, Zn)

125-N. An X-Ray Diffraction Study of the Transformation of Retained Austenite by Fracture. L. W. Pateman and H. S. Peiser. *Nature,* v. 171, Apr. 18, 1953, p. 696-697.

Results of the investigation. (N8, Q26, AY)

126-N. Growth and Slip Patterns on the Surfaces of Crystals of Silver. A. J. Forty and F. C. Frank. *Royal Society, Proceedings,* ser. A, v. 217, Apr. 8, 1953, p. 262-270.

Shows that dislocations in Ag crystals can be located by spiral growth patterns on the surfaces. Monatomic growth steps on both cube and octahedral surfaces are readily visible after they have been "decorated" by the tarnish produced by plasticine. Micrographs. 10 ref. (N12, M26, Ag)

127-N. Orienting Grains in Transformer Steel. Michael J. Bolton. *General Electric Review,* v. 56, May 1953, p. 13-16.

Shows that size and weight of distribution transformers have decreased greatly as a result of orienting grains. Mechanism of grain nucleation and subsequent growth. Graphs. (N2, N3, AY)

128-N. Diffusion and Oxidation of Solid Metals. C. E. Birchenall. *Industrial and Engineering Chemistry,* v. 45, May 1953, p. 907-911.

Investigation of diffusion in metallic solid solutions and the oxidation of metals and alloys. 103 ref. (N1, R2)

129-N. Martensite Habit Plane in Quenched Ti-Mn Alloys. You Chao Liu and Harold Margolin. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 667-670.

Investigation of martensite habit plane in water-quenched Ti-Mn alloys was carried out on Mn contents between 4.35 and 5.25%. Micrographs and diagrams. (N9, Ti, Mn)

130-N. Recrystallization of a Cold-Rolled Copper Single Crystal. Y. C. Liu and W. R. Hibbard, Jr. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 672-679.

Investigation based on pole figure data and microstructural observations. Shows that relative intensity of deformation stresses on various slip planes can be correlated with the choice of poles affecting the rotations found in the recrystallized orientations. Diagrams and micrographs. 22 ref. (N5, Cu)

131-N. Rate of Formation of Isothermal Martensite in Fe-Ni-Mn Alloy. R. E. Cech and J. H. Hollomon. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 685-689.

Results obtained on the isothermal transformations from —79 to —196° C. Graphs and micrographs. (N8, Fe, Ni, Mn)

132-N. Identification of the Precipitate Accompanying 885° F Embrittlement in Chromium Steels. R. M. Fisher, E. J. Dulis, and K. G. Carroll. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 690-695.

Experimental results indicate the formation of a submicroscopic precipitate during embrittlement. Measurements by electron, X-ray diffraction, and magnetic techniques. Micrographs. 20 ref. (N7, AY)

133-N. Densification and Kinetics of Grain Growth During the Sintering of Chromium Carbide. H. J. Hamjian and W. G. Lidman. *Journal of Metals,* v. 5, 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 696-699.

Experimental procedure and results of the study. Micrographs and graphs. (N3, H15, Cr, C-n)

134-N. Pearlitic Rim in Blackheart Malleable Iron. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Apr. 1953, p. 522-524.

Occurrence and probable causes of pearlitic rim. (N8, CI)

135-N. On the Kinetics of the Disorder-Order Transformation in Cu_3Au. Norman W. Lord. *Journal of Chemical Physics,* v. 21, Apr. 1953, p. 692-699.

Isothermal order-dependent change in Young's modulus of a single crystal of Cu_3Au was measured as a function of time at various temperatures from 279.3° C. to 384.3° C. Time variations indicate two distinct stages of the disorder-order transformation. Initial stage is described as the formation of contiguous, antiphase, ordered domains by means of normal atomic interdiffusion. Graphs, tables. 14 ref. (N10, Cu, Au)

136-N. Deterioration of Metals. Relative Costs of Alternate Types of Reactor Vessel Construction. I. E. Boberg and W. R. Fickett. *Petroleum Processing,* v. 8, May 1953, p. 690-692.

Economic aspects of pressure vessel design as influenced by a consideration of graphitization of metal at elevated temperatures. (N8, T29, CN)

137-N. How Serious Is Graphitization? R. J. Fiorentino and A. M. Hall. *Petroleum Refiner,* v. 32, May 1953, p. 132-136.

Investigation of graphitization as the cause of vessel failures. Tests and results. Micrographs. (N8, CN)

138-N. (French.) **Principle of a Molecular Theory of the Rayleigh Diffusion in Crystals.** Lucienne Taurel. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 7, Feb. 16, 1953, p. 682-684.

Rayleigh diffusion through a cubic crystal whose elementary network contains only one atom. (N1)

139-N. (French.) **Diffusion of Ions Across Electrolytic Metallic Coatings.** Helmy Makram. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 9, Mar. 2, 1953, p. 920-921.

Studies at uniform thickness, noting time variation necessary for tagged ions to appear in solution as a result of the Cu^{++} concentration. Graphs. (N1, Cu)

140-N. (German.) **Crystallization of Cast Iron With Nodular Graphite.** A. Wittmoser. *Giesserei,* v. 40, no. 3, Feb. 5, 1953, p. 75-85.

Experimental data which support the hypothesis regarding formation of nodular graphite from the carbon-supersaturated solid solution. (N12, CI)

141-N. (German.) **Chromium Diffusion in Steel.** Walter Katz. *Werkstoffe und Korrosion,* v. 4, no. 2, Feb. 1953, p. 49-57.

Practical and theoretical aspects of the process. (N1, Cr, ST)

142-N. (German.) **Computation of Diffusion Coefficients for Mono and Multiphase Diffusion in Solid Alloys.** Theo Heumann. *Zeitschrift für physikalische Chemie,* v. 201, no. 3-4, Dec. 1952, p. 168-189.

Theoretical discussion. (N1)

143-N. Evaporation of Germanium Films From a Carbon Crucible. K. Lehovec, J. Rosen, A. MacDonald, and J. Broder. *Journal of Applied Physics,* v. 24, May 1953, p. 513-514.

Determines the rate of Ge evaporation in a vacuum as a function of temperature. Photographs, graphs, tables. 5 ref. (N16, Ge)

144-N. Growth of Cadmium Sulfide Crystals. M. E. Bishop and S. H. Liebson. *Journal of Applied Physics,* v. 24, May 1953, p. 660-661.

Two methods of growing cadmium sulphide crystals. Diagram. (N12, Cd)

145-N. (French.) **Physics of Metals. Generalities and Theoretical Considerations on Recrystallization.** C. Crussard. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 47-68.

General review. Al is used to illmicrographs. 59 ref.
(N5, Al, Cu, Mg, Zn, Cd, Ti, Zr, Fe)

146-N. (German.) Observations on Subcooling From Conversion Processes as a Basis for Conversion of Martensite. Edward Houdremont and Otto Krisement. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 53-68.

Conversion temperature was characterized thermodynamically by fact that free energies of both phases are alike. Honda formula was used to compute temperature hysteresis, A_3 conversion of pure Fe, and conversions of alloys. Graphs. 36 ref.
(N8, Fe, AY)

147-N. (Book.) Gases in Metals. 204 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland, 3, Ohio. $3.00.

Includes "Fundamental Metallurgical and Thermodynamic Principles of Gas-Metal Behavior", D. P. Smith; "Gases in Nonferrous Metals and Alloys", L. W. Eastwood; "Gases in Liquid Iron and Steel", D. J. Carney; and "The Behavior of Gases in Solid Iron and Steel"; C. E. Sims.
(N1, N15, P12, Fe, ST, EG-a)

148-N. Graphitization in the Malleable Iron Industry. H. A. Schwartz, W. K. Bock, and J. D. Hedberg. American Foundrymen's Society, Preprint 53-8, 1953, 14 p.

Relationship of all recognizable variables to the rate at which graphite would separate during freezing of white cast iron. Tables.
(N8, E25, CI)

149-N. The Theory of the Growth of Pearlite. E. G. Eeles. *Birmingham Metallurgical Society, Journal,* v. 33, Mar. 1953, p. 29-43.

Edgewise and sidewise nucleation and growth in iron. Graphs.
(N8, Fe)

150-N. Crystallization of Nodular-Graphite Cast Iron. A. Wittmoser. *Foundry Trade Journal,* v. 94, May 14, 1953, p. 547-555.

Three earlier hypotheses developed to explain the mode of occurrence of nodular graphite in cast iron. Role of Si in the graphitization phenomena. Shows that form of the cooling curve for the iron is an indication of a fundamental change in the mode of crystallization. Diagrams, micrographs. 27 ref. (N12, N8, CI)

151-N. Continuous-Cooling Transformation Diagrams of Steels. W. Steven and G. Mayer. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 33-45.

Method for determination of continuous-cooling transformation diagrams that portray course of transformation with temperature in 1 to 6-in. diam. bars quenched in oil. Information derived from oil-quenched bars and from end-quench hardenability curves is compared with that provided by the continuous-cooling transformation diagrams. Graphs, tables, micrographs.
(N8, ST)

152-N. The Effect of Vapor Incidence on the Structure of Evaporated Aluminum Films. L. Holland. *Optical Society of America, Journal,* v. 43, May 1953, p. 376-380.

Dependence of film granulation on vapor incidence angles was investigated for Al. Graphs. (N15, Al)

153-N. The Solubility of Silicon and Germanium in Gallium and Indium. Paul H. Keck and Jacob Broder. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 521-522.

Solubilities were determined over a wide temperature range. For the investigated systems it was found that the heats of solution are approximately proportional to the third power of the radii of the solvent atoms. Upon slow cooling of the saturated solutions Si and Ge crystals of fair purity were obtained.
(N12, Si, Ge, In, Ga)

154-N. Recrystallization and Stored Energy. H. P. Leighly, H. L. Walker, and J. W. Marx. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 809-812.

Relationship between recrystallized grain size and prior deformation is predicted from elementary statistical considerations. Reasonable agreement with experiment is obtained. 28 ref. (N5)

155-N. Concentration Gradients Associated With Growing Pearlite. Richard E. Grace. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 820-821.

Investigation of a short tempering treatment of an Fe-C alloy which should precipitate finely dispersed Fe_3C particles in approximately the same distribution in which C existed during the growth process. (N3, N8)

156-N. Importance of the Iron Content of High-Purity Aluminum. M. Metzger and J. Intrater. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 821-822.

Investigation which shows that, even in relatively pure Al, the be-

havior of the grain boundaries is strongly influenced by small amounts of other elements. Quantitative data obtained at temperatures considerably below the melting point should not be considered as good approximations to the values characteristic of boundaries in ideally pure metal. (N3, Al, Fe)

157-N. Order-Disorder Transformation in Cu-Au Alloys Near the Composition CuAu. J. B. Newkirk. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 823-826.

Results of a Debye-Scherrer X-ray investigations which show that the order-disorder transformation is a first-order or heterogeneous reaction. Evidence was found for conventional tie-line segregation across a usual type of two-phase field separating the ordered and disordered fields in the Cu-Au equilibrium phase diagram. Graphs. 8 ref. (N10, Cu, Au)

158-N. Self-Diffusion of Iron in Iron Oxides and the Wagner Theory of Oxidation. L. Himmel, R. F. Mehl, and C. E. Birchenall. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 827-843.

Rates of self-diffusion of Fe in artificially prepared wustites of various compositions were determined using the decrease in surface activity technique. Data are used to calculate rates. Calculated and experimental rates are compared. Graphs, tables. 43 ref. (N1, R2, Fe)

159-N. A Comparison of Zirconium With Better Known Commercial Metals. Arthur D. Schwope. *Metal Progress,* v. 63, May 1953, p. 75-81.

Compares Zr with other "transition" metals possessing allotropic transformations, such as Fe and Ti. A few basic properties, such as alloying tendencies, effect of alloying on strength, and embrittlement phenomena. Graphs. (N6, Q general, Zr, Fe, Ti)

160-N. Apparatus for Rapid Determination of Liquid-Liquid and Liquid-Solid Equilibria Involving Corrosive Materials. W. Davis, Jr., L. L. Conley, and G. P. Rutledge. *Review of Scientific Instruments,* v. 24, June 1953, p. 431-432.

Apparatus built for measurement of temperatures at which phase changes (precipitation of solid or liquid from a homogeneous solution) are observed. Diagrams. (N12, R general)

161-N. (English.) Crystallography of Phase Transformations. Alfred H. Geisler. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 260-281.

Microstructural and crystallographic features which are associated with transformation products are generalized on the basis of factors such as interfacial surface energy, strain energy, and diffusion. Diagrams, micrographs. 50 ref. (N general, M26, P10)

162-N. (English.) The Formation of η Carbides, Kehsin Kuo. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 301-304.

The formation of carbides from the viewpoint of the relative strength of the transition metal-carbon bond, atomic size factor, and possibility of the carbides being electron compounds. (N8, C-n)

163-N. (English.) Influence of Stress on Martensite Nucleation. J. C. Fisher and D. Turnbull. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 310-314.

Previously developed theory of martensite nucleation is extended to include influence of external stresses. Importance of stresses produced by plastic deformation prior to transformation and presence of a few dislocations in annealed austenite are discussed qualitatively. (N8, N9, Q25)

164-N. (English.) Note on the Formation and Development of Cells in Polycrystalline Zinc. R. C. Gifkins and J. W. Kelly. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 320-324.

Technique of multiple-beam interferometry was used to study formation and development of cell substructure in polycrystalline Zn. Micrographs. (N5, M23, Zn)

165-N. (English.) The Hardening of Metal Crystals by Precipitate Particles. J. C. Fisher, E. W. Hart, and R. H. Pry. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 336-339.

Dependence of the hardening effect of precipitate particles is computed in terms of a model in which the precipitate particles cause the dislocations from activated Frank-Read source to form closed loops about the particles. Results of the analysis are shown to be in agreement with the relevant experimental data. (N7)

166-N. (English.) On the Porosity Observed in the Kirkendall Effect. F. Seitz. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 355-369.

Interprets formation of voids in the Kirkendall experiment in terms of preceding analyses of vacancy diffusion. Studies of the formation of

voids in Cu-Ni, Cu-Zn, Cu-Al and Ag-Au make it possible, with suitable assumptions, to estimate the lifetime of a vacancy in this system. 20 ref. (N1, Cu, Ni, Zn, Al)

167-N. (English.) **Crystallographic Aspects of the Beta to Alpha Transformation in Titanium.** J. B. Newkirk and A. H. Geisler. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 370-374.

Orientation of the α lattice with respect to its parent β lattice; nature of striations found in the macrostructure and their relation to the habit plane of an acicular product; and phenomenon of reversion to the original lattice orientation of an isolated α crystal after it has been heated into the β range and cooled. Micrographs. (N6, Ti)

168-N. (English.) **Thermal Stabilization of Austenite Iron-Carbon-Nickel Alloys.** Samuel J. Rosenberg. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 376.

Varying the cooling rate from 1400 to 5000° F. per sec. in the temperature range 1300 to 900° F. had no significant effect on the temperature of M_s in two Ni alloys. (N8, Ni)

169-N. (German.) **A Simple Method for Preparation of Al Monocrystals of Fixed Orientation.** Helmut Weik. *Zeitschrift für angewandte Physik,* v. 5, no. 3, Mar. 1953, p. 119-120.

Process for making monocrystals from Al wire. Orientation can be controlled to 1 or 2°. Diagrams. 3 ref. (N5, Al)

170-N. (German.) **Reactions of Solid Iron With Molten Aluminum and Aluminum Alloys.** Erich Gebhardt and Walter Obrowski. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 154-160.

Examines growth layers of solid Fe with molten Al and several Al alloys, by measuring thicknesses of layers; studying their microstructures; testing hardness; and X-raying and chemical analyses. Tables, graphs, photomicrographs. 20 ref. (N12, Fe, Al)

171-N. The 475° C Hardening Characteristics of Some High-Alloy Steels and Chromium Irons. B. Cina and J. D. Lavender. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 97-107.

Phenomenon of "475° C. embrittlement" was observed in certain duplex ($\gamma + \delta$) high alloy steels after treatment from 350 to 525° C. Its development was investigated by measurement of hardness, electrical resistivity, and magnetic and mechanical properties; microstructural changes; and by X-ray diffraction studies of filings, block samples, and electrolytically extracted residues. Comparative work was carried out on two Cr irons. Graphs, tables, micrographs. 24 ref. (N8, M23, AY, CI)

172-N. Recovery of Cold-Worked Zirconium. W. A. Bostrom and S. A. Kulin. Paper from Zirconium and Zirconium Alloys. p. 186-196. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Annealing of cold worked Zr was studied as a function of time at temperature by measurement of changes in electrical resistance. Noticeable recovery occurred even at 100° C. and recovery was quite rapid at the higher tempertures studied. Graphs. 9 ref. (N4, J23, Zr)

173-N. The Solid Solubility of Tin in Alpha Zirconium. G. R. Speich and S. A. Kulin. Paper from Zirconium and Zirconium Alloys. p. 197-207. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Solid solubility was determined at high temperatures by changes in lattice parameter and at low temperatures by a strain aging technique. Limitations of method for determination of low-temperature solubilities. Graphs, tables. 8 ref. (N12, Zr, Sn)

174-N. Observations on the Alpha-Beta Transformation in Zirconium. E. E. Hayes and A. R. Kaufmann. Paper from Zirconium and Zirconium Alloys. p. 241-253. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Observable characteristics of the transformation of pure Zr were found to differ in two respects from impure Zr. Investigations and results. 11 ref. (N6, Zr)

175-N. (English.) **On the Solid-Liquid Transformation in Metals.** G. Borelius. *Archiv för Fysik,* v. 6, no. 3, 1953, p. 191-206.

Thermodynamic calculations based on assumption of continuity between solid and liquid states and separation of the internal energy of metals into parts of vibrational and structural origin. Leads to new possibilities of interpretating subcoolability of liquid metals and thermal expansion phenomena. Graphs. 35 ref. (N12, P11, P12)

176-N. (English.) **On Fusion as Order-Disorder Transition.** G. Borelius. *Arkiv för Fysik,* v. 6, no. 3, 1953, p. 207-212.

Solid-liquid transition as an order-disorder phenomenon demonstrating

characteristic differences between the two phenomena. Graphs. (N12, N10)

177-N. (German.) **Course of Diffusion Processes in Substitutive Solid Solutions.** Theo. Heumann and Alfons Kottmann. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 139-154.

Explains Kirkendall effect by reviewing literature which substantiates Darken theory of partial-diffusion coefficients. Graphs, tables, photomicrographs. 63 ref. (N1)

178-N. (German.) **Particle-Size-Distribution During Recrystallization of Pure Aluminum.** Werner Dickenscheid and Hugo Josef Seemann. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 211-216.

Tests were made on rolled, pure Al. The Dederichs-Kostron method was used. Tables, figures. 23 ref. (N5, Al)

179-N. (German.) **Hardening of Aluminum-Silver Alloys. VII. Concentration Dependence of Hardening.** Werner Köster and Franz Sperner. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 217-219.

States of hardening of 50-50 Al-Ag alloys at temperatures between 100 and 300° C. Comparison with 38% Ag alloy. 3 ref. (N7, Al, Ag)

180-N. (German.) **Structure of Thin Silver Deposits.** H. Göttsche. *Zeitschrift für Physik,* v. 134, no. 5, 1953, p. 517-525.

Refraction diagrams show that thin vapor deposits of Ag have no hexagonal Ag phase. The effect of displacements of the crystallites (slight bending, breaking, or curving of the deposit) and of irregular lattice defects on the interference picture are investigated. Diagrams, tabulated data. 8 ref. (N15, Ag)

181-N. (Book.) **Graphite Formation in Ductile Cast Irons.** V. A. Altekar and Luiz Antonio de Araujo. 67 p. Dept. of Publications, Colorado School of Mines, Golden, Colo. $1.00.

Study of the formation of nodular graphite in cast irons, and the production of nodular cast iron with calcium. Chemical and thermal factors affecting graphitization. History of research regarding formation of graphite in spheroidal or nodular form and theories of nodulization. (N8, CI)

182-N. Experiments on Spherulite Formation in Cast Iron. Jack Keverian, Howard F. Taylor and John Wulff. *American Foundryman,* v. 23, June 1953, p. 85-91.

Experiments to determine whether absence rather than presence of certain components causes spherulite formation. Micrographs. 25 ref. (N12, E25, CI)

183-N. X-Ray Broadening From Precipitation in Cu-Fe Alloys. T. S. Hutchison. *Journal of Applied Physics,* v. 24, June 1953, p. 813-814.

Results of heat and mechanical treatments on the physical properties of Cu-Fe alloys were studied by X-ray diffraction photographs. Graphs. 9 ref. (N7, M22, Q general, Cu, Fe)

184-N. A Statistical Theory of Order-Disorder Equilibrium at High Temperatures. Philip Schwed and Gerhart Groetzinger. *Journal of Chemical Physics,* v. 21, June 1953, p. 963-964.

An expression for the free energy of a binary cubic alloy undergoing order-disorder transition, derived by direct evaluation of the configurational partition function. 5 ref. (N10, P12)

185-N. The Correlation of Solid Metal and Nonelectrolyte Solubilities. Peter L. Auer. *Journal of Chemical Physics,* v. 21, June 1953, p. 1113-1114.

Compares Hildebrand's and Kleppa's methods. (N12)

186-N. Martensite Nucleation in Substitutional Iron Alloys. John C. Fisher. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 918-920.

Nucleation theory is applied to martensite nucleation in substitutional Fe alloys. Composition fluctuations are neglected, and a steady rate of nucleation is predicted for any composition and temperature. Maximum rate of nucleation is shown to be measurable only for an extremely narrow composition range, being too great or too small outside this range. Graphs. 10 ref. (N2, Fe, Ni)

187-N. Effect of Nickel and Molybdenum on Stabilization of the Austenite-Martensite Transformation. D. J. Blickwede. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 922-923.

Investigation to provide information about the effect of two common elements on stabilization in hyper- and hypo-eutectoid steels. (N8, Ni, Mo)

188-N. Preferred Precipitations in Some Age-Hardened Aluminium Alloys. Hideo Nishimura and Yotaro Murakami. *Memoirs of the Faculty of Engineering, Kyoto University,* v. 15, Jan. 1953, p. 9-26.

Results for a submicroscopic investigation using an electron microscope. Micrographs. (N7, M21, Al)

189-N. Solute Distribution in Germanium Crystals. W. P. Slichter and E. D. Kolb. *Physical Review,* v. 90, June 1, 1953, p. 987-988.

Growth of Ge crystals from the melt. (N12, Ge)

190-N. Calculation of Martensite Nucleus Energy Using the Reaction-Path Model. J. C. Fisher and D. Turnbull. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 921-922.

Calculations. 7 ref. (N9)

191-N. On the Decomposition of Retained Austenite in Steel When Being Shot Peened. N. A. Karasev. Henry Brutcher Translation 2957, 4 pages. (From *Vestnik Mashinostroeniya,* v. 32, 1952, no. 1, p. 44-46.)

Results of microscopic analysis of steels before and after shot peening. Photographs, graphs. 4 ref. (N8, M27, G23, ST)

192-N. Influence of Grain Size Upon Diffusion of Nitrogen. A. G. Andreeva, I. E. Kontorovich, and A. A. Sovalova. Henry Brutcher Translation 3010, 10 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 17, 1947, no. 12, p. 1521-1526.)

An experimental study of the effect of different grain sizes upon depth of diffusion of N into "Armco" Fe. Table, graphs. 6 ref. (N1, M27, Fe)

193-N. Investigation of Diffusion of Chromium in Iron-Chromium Alloys Containing Third Elements. S. Gertsriken and I. Dekhtyar. Henry Brutcher Translation 3013, 20 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 20, 1950, no. 8, p. 1005-1014.)

The process of diffusion of Cr in Fe-Cr alloys with additions of Ni, Be, Ti, W, Si, Sn, and Cb, which differ from one another in valency and atomic radius. Tables, graphs. 10 ref. (N1, Fe, Cr, Ni, Be, Ti, W, Si, Sn, Cb)

194-N. Influence of Alloying Elements Upon Martensite Transformation Temperatures. I. V. G. Vorob'ev and A. P. Gulyaev. Henry Brutcher Translation 3020, 10 pages. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 21, 1951, no. 10, p. 1157-1163.)

Importance of a knowledge of the initial and final temperatures for the industrial cold treating of steel. Table, graphs. 18 ref. (N8, J2, AY)

195-N. On The Initial Stages of Fusion of Complex Metallic Systems. N. T. Gudtsov and M. G. Lozinskii. Henry Brutcher Translation 3043, 8 pages. (From *Doklady Akademii Nauk SSSR,* v. 73, 1950, no. 4, p. 689-692.)

Experiments involving the heating of complex alloys and studying structural changes during the heating process. Diagram, photographs. 6 ref. (N6, AY, Mo, Cr, Cb, Mn, Si)

196-N. (German.) **Formation and Properties of Delta Iron (Ferrite) and Sigma Phase in Austenitic Chromium-Nickel Steels.** Herbert Buchholtz, Hanz Krächter and Franz Kraemer. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 113-125.

18% Cr steels and 9% Ni steels do not lend themselves to ferritic separation under ordinary treatment. Delta- to sigma-phase conversion was achieved in high-temperature quenched alloys by tempering. Photographs, graphs, tables. 14 ref. (N8, P general, Q general, SS)

197-N. (German.) **Formation of Nuclei During Conversions in Irreversible Iron-Nickel Alloys.** Georg Masing and Otto Nickel. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 143-151.

Results of thermodynamic computations and tests. It is possible for compositions of phases observed in delayed-conversion processes to deviate from equilibrium diagram. Graphs, diagrams, tables. 30 ref. (N2, P12, M24, Fe, Ni)

198-N. (German.) **Irreversibility of Iron-Nickel Alloys.** Erich Scheil. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 153-160.

Difficulties of determining $\alpha + \gamma$ equilibria because of athermal conversion. Conversions can be hindered by mechanical stresses and may be linked with compositional changes. Photographs, graphs. 48 ref. (N6, Fe, Ni)

199-N. (German.) **Signs of Aging in Unalloyed, Soft Cast Steels.** Werner Hesse. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 173-181.

Rockwell hardness measurements on openhearth and bessemer steels. Graphs. 23 ref. (N7, Q29, CI)

200-N. Some Effects of Nitrogen in Cast Iron. J. V. Dawson, L. W. L. Smith, and B. B. Bach. *British Cast Iron Research Association,* v. 4, June 1953, p. 540-552.

Influence of N on graphitization and mechanical properties. (N8, Q general, CI)

201-N. **The Application of Grain Refinement to Cast Copper-Aluminium Alloys Containing the Beta Phase.** J. P. Dennison and E. V. Tull. *Institute of Metals, Journal,* v. 81, July 1953, p. 513-520.

Additions of boron were used to produce nucleation. Laboratory results were confirmed on commercial scale. Mechanical properties were improved. Tables. 35 ref. (N2, Q general, Cu, Al)

202-N. **Epitaxial Deposits of Metals Evaporated on Salt Substrates.** Olive G. Engel. *National Bureau of Standards, Journal of Research,* v. 50, May 1953, p. 249-261.

Experimental data and theoretical considerations relating to the process of oriented overgrowth of crystals. Case of epitaxy resulting from vapor phase deposition of metals on rock salt. Au and Ag were used. Micrographs, diagrams, tables. 40 ref. (N15, Au, Ag)

203-N. **Crystal Growth and Crystal Boundary Techniques.** Bruce Chalmers. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 170-185.

The method of making a metal crystal depends on what the specimen is to show. Methods include vapor phase formation, growth from solution, solidification, and growth in the solid state. (N12, N15)

204-N. (English.) **The Crystallography of the Titanium Transformation.** Carl J. McHargue. *Acta Crystallographica,* v. 6, June 1953, p. 529-530.

Experimental procedure. (N6, Ti)

205-N. (French.) **Present State of the Metallography of Alloyed Austenites, Particularly in 18-8 Steels. II. Reactions by Diffusion in Austenites With a High Content of Alloy Elements.** Paul Bastien and Jacques Dedieu. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 95-101.

Compares diffusion in interstitial and substitutional alloys. Effects of temperature, composition, and cold work. Tables, graphs. 14 ref. (N1, N8, SS)

206-N. (Italian.) **Separation of Graphite in Nodular Iron.** Carlo Longaretti and Roberto Sacerdote. *Metallurgia Italiana,* v. 45, no. 3, Mar. 1953, p. 94-99.

Cooling curves were determined for nodular iron before and after treatment with Mg and "FeSi 75". Diagrams, photographs. 14 ref. (N8, CI)

207-N. (Russian.) **Phase and Structural Transformations in Steel During Repeated Recrystallization.** D. S. Kazarnovskii. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 3, Nov. 21, 1952, p. 409-413.

Effect of grain boundaries and degree of dispersion of carbides in the initial structure and the grain size and mechanical properties after recrystallization. Carbon steels (0.47% C; 0.78% Mn; 0.25% Si) and (0.57-0.67% C; 0.68-0.83% Mn; 0.16-0.21% Si) and chromium steels (0.46% C; 0.72% Mn; 0.25% Si; 0.77% Cr) were studied. Tables, graphs, micrographs. 13 ref. (N5, M27, C, CN)

208-N. (Russian.) **Existence of Metalloids Dissolved in Metal.** O. A. Esin and P. V. Geld. *Uspekhi Khimii,* v. 22, no. 1, Jan. 1953, p. 62-86.

Shows the C, H, and probably N, existence in liquid Fe. Points out existence of Cr, Mn, Ni, and Co in form of positively charged particles. Figures, tables. 75 ref. (N12)

209-N. (Russian.) **Carbide Formation in Alloyed Steels at High Annealing Temperatures.** G. V. Kurdiumov and M. D. Perkas. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 1, Nov. 1, 1952, p. 41-43.

Effects of Ti, V, and Mo as alloying elements and of temperature. 7 ref. (N8, Ti, V, Mo)

210-N. (Book—French.) **(The Solid State. Reports and Discussions.) L'Etat solide. Rapports et discussions.** Solvay International Institute of Physics, 577 p. 1952. R. Stoops, Brussels, Belgium. 650 francs.

Consists of papers given at the Ninth Physics Council held at the Free University of Brussels, Sept. 25-29, 1951. Papers are concerned with work on grain boundaries, recrystallization, transformations, and dislocations. (N general)

211-N. **Carbide Precipitation, Secondary Hardening, and Red Hardness of High-Speed Steel.** Kehsin Kuo. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 223-228.

Electrolytic extraction and X-ray powder methods. Tables. 20 ref. (N7, Q29, TS)

212-N. **Diffusion in Metals.** A. D. Le Claire. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 229-236.

Principal results obtained from experimental and theoretical work on diffusion in metals. 7 ref. (N1, Cu)

213-N. **On the Solubility of Hydrogen in Certain Liquid Metals.** Y. L. Yao. *Journal of Chemical Physics,* v. 21, July 1953, p. 1308-1309.

Behavior of metals can be divided into three rough groups. Concludes that trends permit estimations of unknown solubilities. (N12)

214-N. Influence of Aluminum and Silicon Deoxidation on the Strain Aging of Low-Carbon Steels. W. C. Leslie and R. L. Rickett. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1021-1031.

Influence of deoxidation practice, prior thermal history, aging time, and temperature on the strain-aging behavior of low-carbon openhearth steels. Graphs, tables. 35 ref. (N7, Al, Si, CN)

215-N. Some Properties of Columbium Containing Nitrogen. Choh-Yi Ang and C. Wert. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1032-1036.

Quench aging and its effects on physical and mechanical properties. (N7, P general, Q general, Co)

216-N. On the Mutual Transformation of Lattices. B. A. Bilby. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 782-785.

Mutual transformation of lattices by homogeneous deformation and the transformation of Co. 5 ref. (N10, Co)

217-N. The Martensitic Transformation in Cobalt. Z. B. Basinski and J. W. Christian. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 791-792.

Brief note. (N9, Co)

218-N. Heat Flow and the Growth of Metal Single Crystals From the Melt. A. J. Goss. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 525-532.

Theoretical analysis for heat flow in a crystallizing metal rod and three cases corresponding to slow, medium and fast rates of growth. Importance of heat flow on form and orientation of the crystals. Graphs. 18 ref. (N12)

219-N. (English.) **Structure of the Allotropic Forms of Strontium.** E. A. Sheldon and A. J. King. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 100.

Examined by X-ray powder technique. Sr was observed in three forms with transitions at 215±10° C. and 605±10° C. (N6, M22, Sr)

220-N. (English.) **The Redistribution of Solute Atoms During the Solidification of Metals.** W. A. Tiller, K. A. Jackson, J. W. Rutter, and B. Chalmers. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 428-437.

Quantitative analysis made of the redistribution of solute resulting from solidification of a binary solution for transient and steady state conditions. Diffusion in the liquid is shown to be of importance in determining the solute distribution in both the liquid and the solid. Values for length of the constitutionally supercooled zone of liquid adjacent to a growing solid-liquid interface are calculated. 9 ref. (N12)

221-N. (English.) **The Theory of D_o in the Arrhenius Equation for Self-Diffusion in Cubic Metals.** A. D. Le Claire. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 438-447.

Extends Zener's theory of D_o. Experimentally observed values of D_o and Q are consistent only with the supposition of a vacancy mechanism in face-centered metals and with a ring mechanism in body-centered cubic metals. 27 ref. (N1)

222-N. (English.) **Mercury Whiskers.** G. W. Sears. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 457-459.

Growth mechanism. (N12, Hg)

223-N. (English.) **On the Debye Model and Low Temperature Phase Transformation in Lithium.** W. DeSorbo. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 459-460.

Explanation for discrepancy between the Debye model and specific heat data below liquid air temperatures. 11 ref. (N6, Li)

224-N. (English.) **Thermal Stabilization of Austenite in Nickel Steels.** T. Ko and B. Edmondson. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 466-467.

Experiments compared with those of Morgan and Ko. (N8, AY)

225-N. (English.) **The Orientation Relationships Between Cementite and α-Iron.** N. J. Petch. *Acta Crystallographica,* v. 6, pt. 1, Jan. 1953, p. 96.

Precipitation of cementite in the tempering of martensite and its relation to a paper by Trillat and Oketani (1952). (N7, Fe)

226-N. (French.) **Short Range Order in Substitutional Solid Solutions in Metals.** Gerard Fournet. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 383-389.

Short range order always exists in substitutional solid solutions. Expressions are given for a very simple model. 15 ref. (N10)

227-N. (French.) **The Effect of Nitrogen on the Properties of Cementite.** R. Bridelle and A. Michel. *Revue de Métallurgie,* v. 50, no. 6, June 1953, p. 410-412.

Quasi-constancy of the parameters of cementite, the variation of the Curie point, and the effect of N on the stability of cementite and austenite. Graphs. 11 ref. (N8, M26, Fe)

228-N. (French.) Electron Diffraction Study of Aluminium-Copper Alloys Produced by Evaporation in Vacuo. Jean Jacques Trillat and Noboru Takahashi. *Revue de Métallurgie,* v. 50, no. 6, June 1953, p. 427-432.

Possibility of obtaining mixtures or definite phases of Al or Cu by evaporation of these metals or their alloys in a vacuum. Graphs, photographs. 5 ref. (N16, M22, Al, Cu)

229-N. (German.) Influence of Hydrogen Diffusion on Critical Total Reduction of Soft Carbon Steel. Friedrich Erdmann-Jesnitzer and Hermann Schumann. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 211-213.

Possibility of using atomic H to displace the amount of critical cold work proven experimentally. 7 ref. (N1, CN)

230-N. (German.) Diffusion-Grain Formation in Ferro-Alloys. Friedrich Erdmann-Jesnitzer, Hermann Schumann, and Manfred Beckert. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 215-227.

Proposes that diffusion of C into alpha-iron proceeds faster than into gamma-iron grains. Tests made on Fe-Al, Fe-Si, Fe-P, and Fe-Cr systems. Photographs, diagrams. 60 ref. (N1, Fe, Al, Si, Cr)

231-N. (German.) Crystallization of Cast Iron With Nodular Graphite. Erich Scheil and Leo Hutter. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 237-246.

Process and resulting properties. Photographs, graphs, diagrams. 41 ref. (N12, CI)

232-N. (German.) Separation Processes in Supersaturated Solid Solutions. Wolfgang Wepner. *Archiv für das Eisenhüttenwesen,* v. 24, no. 5-6, May-June 1953, p. 275-279.

Theoretical researches on Cottrell Bibby theory. New precipitation equation. Graphs. 12 ref. (N7)

233-N. (German.) Dislocations and Allotropic Changes. Alfred Seeger. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 247-253.

Geometry of dislocations. Test results on allotropic change in Co, and dislocation mechanism for this change. Diagrams. 33 ref. (N6, Co)

234-N. (German.) Stability of Inorganic Compounds in a High Vacuum. M. Auwärter. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 1-7; disc., p. 7.

Processes taking place during the melting of inorganic compounds, particularly oxides in high vacuum, are demonstrated for a number of substances. Results lead to conclusion regarding the mechanism of melting and sintering of metals, alloys and metallic compounds in high vacuum. Diagrams, graphs. (N12)

235-N. (German.) Diffusion in Solid Metals. W. Seith. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 65-75; disc., p. 75-80.

New experimental results. Modern concept of the interchange mechanism as derived from the results. Special attention to conditions prevailing during sintering of metal powders. Diagrams, micrographs. 16 ref. (N1, H15)

236-N. (English.) The Solid Solubilities of Some Stable Carbides in Cobalt, Nickel, and Iron at 1250° C. R. Edwards and T. Raine. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 232-242; disc., p. 243.

Experimental procedure. Micrographs, tables. (N12, Co, Ni, Fe)

237-N. (German.) Formation of Solid Solutions in High-Temperature Melting Cermets. R. Kieffer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 268-296; disc., p. 296.

Diffusion processes involved in the formation of solid solutions were studied by metallography and microhardness measurements. Diagrams, graphs, tables, micrographs. 39 ref. (N1)

238-N. (German.) Influence of Adsorbed Gases on the Bond Stability of Solid Bodies in the Surface Region. H. Forestier, J. Mauer, J. P. Kiehl, and P. Stahl. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 8-19; disc., p. 19-20.

Effect of gas adsorption on stability of crystal lattices. Experimental data permit theoretical interpretation. Graphs. 13 ref. (N1)

239-N. (English.) Investigations on Ternary Systems Me_1-Me_2-B, and a Discussion of the Relative Strength of the Bond Transition Metal-Boron. R. Kiessling. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 297-301; disc., p. 301-302.

Strength of bonds between transition metals and B. Applications to powder metallurgy.
(M24, H general, B)

240-N. (Russian.) Determination of Diffusion Coefficients of Metals in Mercury. A. G. Stromberg. *Doklady*

Akademii Nauk SSSR, v. 85, new ser., no. 4, Aug. 1, 1952, p. 831-834.
Application of amalgam polarography. Data are tabulated and charted. 5 ref.
(N1, Hg, Cd, Pb, Zn, Tl, Bi)

241-N. (Russian.) **Structural (Phase) Transformations in the Metalloceramic Composition Iron-Graphite During Sintering.** V. I. Likhtman and I. N. Smirnova. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 6, Oct. 21, 1952, p. 1151-1153.
Sintering was done in a high vacuum at 1000° C. for 1 hr. and in a N_2 medium at 110° C. for 10 min. Micrographs. 2 ref. (N6, H15, Fe)

242-N. (Russian.) **Stabilization of Residual Austenite During Cold Treatment of Steel.** A. P. Guliaev and M. S. Chaadaeva. *Vestnik Mashinostroeniia,* v. 33, no. 1, Jan. 1953, p. 37-42.
Effect of holding time of hardened steel at room temperature on austenite. Tables, graphs. (N8, AY)

243-N. (German.) **Sorption Properties of Thin Nickel Layers.** Werner Scheuble. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 125-140.
Speaks of sorption of O_2 by steamed nickel layers. Amount of sorption depends on gas pressure in apparatus; penetrability is dependent on temperature. Effects of precoating with either H_2 or O_2 on sorption of these gases. Graphs. 9 ref. (N1, Ni)

244-N. (French.) **Recrystallization of Pure Iron by Polygonization.** Jean Talbot, Christian De Beaulieu and Georges Chaudron. *Comptes rendus,* v. 236, no. 8, Feb. 23, 1953, p. 818-820.
Pure Fe was rolled to a thickness of 0.2 mm. The test pieces were annealed for 24 hr. at 920° in a current of pure, dry H and elongated 3%. Results and subsequent test. 8 ref. (N5, Fe)

245-N. (German.) **The Allotropy of the Metalloids.** Heinz Krebs. *Angewandte Chemie,* v. 65, no. 11, June 1953, p. 293-299.
Allotropic behavior of Se, S, Te, P, As, Sb, Bi, C, Si and Ge, their lattice structures and the conditions under which they change from one modification into another. Diagrams, graphs, tables.
(N6, M26, Se, S, Te, P, As, Sb, Bi, C, Si, Ge)

246-N. **A Theory of Globular Graphite Formation in Cast Iron. II.** Ichiro Iitaka. *Castings Research Laboratory, Report,* no. 4, 1953, p. 4-6.
Experimental evidence. Photomicrographs. (N8, E25, CI)

247-N. **The Effect of Alloying Elements on the Graphitization of White Iron Containing Small Per Cent of Chromium.** Nobuhisa Tsutsumi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 23-26.
Tables, graphs. (N8, CI)

248-N. **On the Transformation of Steel by Rapid Heating. III. On the Eutectoid Transformation.** Kiyoshi Yokota and Nobuhiro Iguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 33-35.
Studies were made on effect of heating rates (7 to 500° C per sec.) on the eutectoid transformation of steels. 7 ref. (N8, ST)

249-N. **A Tentative Theory of Metallic Whisker Growth.** J. D. Eshelby. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 755-756.
Dislocations, surface tension and chemical reaction with the atmosphere are used to explain phenomenon. (N2)

250-N. **Effect of Prestraining on Recrystallization Temperature and Mechanical Properties of Commercial, Sintered, Wrought Molybdenum.** Kenneth C. Dike and Roger A. Long. *National Advisory Committee for Aeronautics,* Technical Note 2973, July 1953, 25 p.
Investigation of the feasibility of raising recrystallization temperature of commercial Mo by limiting the amount of prestraining without sacrificing strength or ductility. Graphs, tables, micrographs.
(N5, Q23, Mo)

251-N. (French.) **Light Phenomenon in the Investigation of Aluminum Alloys.** Christiane Changarnier and Jean Calvet. *Comptes rendus,* v. 237, no. 2, July 15, 1953, p. 179-181.
Age hardening of 6% Cu_2, 0.25% Mn, 0.12% Ti alloy prepared from pure metals. (N7, Al)

252-N. (German.) **Relationship Between the Partial and the General Diffusion Coefficients in Metallic Solid Solutions.** Theo. Heumann. *Naturwissenschaften,* v. 40, no. 5, p. 164.
Critically discusses computations. Tables. 16 ref.
(N1, Ag, Au, Zn, Cu, Ni)

253-N. **Factors Affecting the Transformation to Gray Tin at Low Temperatures.** R. R. Rogers and J. F. Fydell. *Electrochemical Society, Journal,* v. 100, Sept. 1953, p. 383-387.
Effect of composition and thickness of Sn, temperature at which transformation takes place and history of Sn prior to transformation. Tables, photographs. 5 ref. (N6)

254-N. **Growth Characteristics of Ingot-Mould Irons in Air and Vac-**

uum. J. W. Grant. *Foundry Trade Journal,* v. 95, Sept. 3, 1953, p. 281-287; Sept. 10, 1953, p. 321-331.

Theories of growth of cast iron, including oxidation and cracking. Oxidation and growth at sub-critical temperatures, repeated heating in vacuum, effect of oxidation on the formation and decomposition of austenite, and repeated heating in air. Tables, graphs, micrographs. (To be continued.) 19 ref. (N8, CI)

255-N. Subgrain Formation in High-Purity Aluminum During Creep at High Temperatures. Andre M. Gervais, John T. Norton, and Nicholas J. Grant. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1166-1174.

Creep deformation of coarse-grained high-purity Al at temperatures approaching the melting point permitted the fromulation of a theory of subgrain formation. 34 ref. (N3, Q3, Al)

256-N. Recovery in Single Crystals of Zinc. R. Drouard, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1226-1229.

Investigation of temperature dependence of the rate of recovery in Zn single crystals after a simple shear deformation at low temperature. Tentative suggestions regarding annealed and strain-hardened states. Diagrams, graphs. (N4, Zn)

257-N. Orientation Relationships in the Recrystallization of Deformed Copper Single Crystals. J. J. Becker and J. N. Hobstetter. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1235-1238.

Deformed Cu single crystals exhibited, after annealing, either a recrystallized twinned grain with a twin plane parallel to an active deformation plane rotated approximately 22° about its pole, or else did not recrystallize at all. Micrographs, diagrams. (N5, Cu)

258-N. Rate of Propagation of Martensite. R. F. Bunshah and R. R. Mehl. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1251-1258.

Fast amplifier technique developed for measurement of the above in an Fe-29.5% Ni alloy. Diagrams, graphs. 19 ref. (N8, Fe)

259-N. Migration of Cr and C in a Weld in Type 502. M. A. Scheil. *Metal Progress,* v. 64, Sept. 1953, p. 108, 110.

Abnormalities in 4 to 6% Cr steel welded with 25-20 Cr-Ni electrode, heated at 1290° F. for 10,000 hr. Micrographs, table. (N1, SS)

260-N. The Dependence of the Diffusion Coefficient on Atomic Interaction in Metals and Alloys. I. Ya. Dekhtyar. *National Science Foundation Translation,* no. NSF-tr-25, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 49.

Not only the energy of activation of diffusion but also the diffusion coefficient are determined by nature and magnitude of interatomic bonds. (N1, Cu, Ag, Au, Pb, Co, Fe, W, Zn, Sn, Al, Ni, Mn)

261-N. On the Theory of Decomposition of Supersaturated Solutions. I. V. Salli. *National Science Foundation Translation* no. NSF-tr-24, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 61.

Variations in crystal growth rate causing different formations of structure. Diagrams, graph. (N12, Al, Fe)

262-N. On Tin Whiskers. F. C. Frank. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 854-860.

Theory of whisker growth. (N12, Sn)

263-N. Studies of Continuous Phase Transformations With X-Rays. E. Gillam and D. G. Cole. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 999-1010.

Principle and application of method, apparatus, specimen treatment and accuracy. Graphs, tables, diagram. 14 ref. (N6, ST)

264-N. (English.) **The Growth of Platinum Crystals Out of $PtCl_4$.** E. Votava. *Naturwissenschaften,* v. 40, no. 16, 1953, p. 437-438.

Using plastic cover plates instead of muscovite, crystals were obtained with visible growth layers. Micrographs. 4 ref. (N12, Pt)

265-N. (English.) **Influence of Volume Changes and Lattice Vibrations in Order-Disorder Transitions.** L. Saroléa. *Physica,* v. 19, no. 7, July 1953, p. 615-626.

Alloys with two equivalent and nonequivalent sublattices. Graph. 14 ref. (N10, Cu)

266-N. (French.) **Carbides Formed During Tempering of Martensite.** Jacques Pomey and Raymond Coudray. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 62-64.

Formation of unstable epsilon phase, considerably more stable

zeta phase, and transformation into cementite. Graph. (N8, Fe)

267-N. (French.) **Researches on Heat Resistant Austenitic Alloys Having a Low Content of Scarce Metals.** W. Siegfried and F. Eisermann. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 485-492; disc., p. 492-494.

Limits of recrystallization and of recovery and hardness tests on 13% Cr alloys containing additions of Mo, W, V, Cb and on austenitic alloys. Tables, graphs, photographs. (N4, N5, Q29, Cr)

268-N. (French.) **Thermo-Elastic Analysis of Transformations in Metallic Alloys.** R. Cabarat, P. Gence, L. Guillet, and R. Le Roux. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 495-499.

Effect of allotropic transformation on the internal friction of alloys. Graphs. 12 ref. (N6, Q22, Al, Be).

269-N. (German.) **Reaction Velocity of Metallic Phases in the Range of Allotropic Modifications.** F. Erdmann-Jesnitzer and L. Marx. *Metall,* v. 7, nos. 13-14, July 1953, p. 499-501.

Hedvall's Law, the reaction of solids with gases when modificational changes occur, reaction velocity of alpha-gamma change of Fe for Fe-Al system, and results of measurements. Graphs. 11 ref. (N6, Fe)

270-N. (German.) **The Condensation of Metal Vapors on Hot Surfaces.** W. Opitz. *Zeitschrift für Physik,* v. 135, no. 1, 1953, p. 1-12.

Condensation temperatures were determined for a number of high-boiling metals, and condensation curves compared with thermodynamic saturation pressure curves. Tables, graphs. (N16, Ag, Sn, Mn, Al, Cr, Cu, Au, Pb, Ge, In, Ga, Be, Bi, W)

271-N. (Italian.) **On the Determination of Temperature-Time-Transformation Curves.** M. Casadio. *Metallurgia italiana,* v. 45, no. 5, May 1953, p. 163-165.

Use of hot-hardness tests to determine isothermal transformation of austenite. Microphotographs. 4 ref. (N8, Q29, Fe)

272-N. (Russian.) **Problem of Frontal Diffusion in Commercial Iron.** V. I. Arkharov, K. A. Efremova, S. I. Ivanovskaia, A. K. Shtol'ts, and B. A. Iunikov. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 269-270.

Diffusion of Ni, Pd, Cu and Cr in commercial Fe. 6 ref. (N1, Ni, Pd, Cu, Cr, Fe)

273-N. (Russian.) **Heterogeneity of Austenite.** I. A. Oding and M. G. Lozinskii. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 275-278.

Important factors in the development of heterogeneity in the structure of austenite grains in steel. Graph, diagram, micrographs. 8 ref. (N8, ST)

274-N. Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Molybdenum Alloys. H. D. Kessler and M. Hansen. *American Society for Metals, Preprint* no. 5, 1953, 22 p.

End-quench hardenability, time-temperature - transformation, age hardening and mechanical properties. Tables, graphs, micrographs. 13 ref. (N9, J26, J27, Q general, Ti, Al, Mo)

275-N. Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Chromium Alloys. H. D. Kessler and M. Hansen. *American Society for Metals, Preprint* no. 6, 1953, 28 p.

End-quench hardenability, time-temperature - transformation, age hardening, and mechanical properties were studied. Tables, graphs, micrographs. 5 ref. (N9, J26, J27, Q general, Ti, Al, Cr)

276-N. A Time-Temperature Relationship for Recrystallization and Grain Growth. F. R. Larson and J. Salmas. *American Society for Metals, Preprint* no. 10, 1953, 22 p.

A parameter which evaluates relative effects of time and temperature was applied to recrystallization and grain growth. Tables, graphs. 21 ref. (N5, N3, Cu, Zr, Al, Ni, Fe, Mn)

277-N. Effect of Nonmartensite Decomposition Products on the Properties of Quenched and Tempered Steels. E. F. Bailey. *American Society for Metals, Preprint* no. 11, 1953, 18 p.

Times necessary for 10 and 30% decomposition to ferrite, pearlite and bainite in AISI 1340 and 5140 were determined using Charpy bar-size specimens quenched into isothermal baths. Tables, graphs, micrographs. 8 ref. (N8, Q general, AY)

278-N. Supercooling and Dendritic Freezing in Alloys. W. C. Winegard and B. Chalmers. *American Society for Metals, Preprint* no. 16, 1953, 10 p.

Supercooling may result from enrichment in solute of the liquid immediately ahead of the advancing solid-liquid interface. Graphs, diagrams. 10 ref. (N12, Cu, Sn)

279-N. Elevation of Critical Temperatures in Steel by High Heating Rates. W. J. Feuerstein and W. K.

Smith. *American Society for Metals, Preprint* no. 19, 1953. 12 p.

Ac_1 and Ac_3 critical temperature determined for AISI 1020, 1042, 1080 and 4130 steels in the annealed condition. Table, graphs, diagram. 6 ref. (N8, J23, AY)

280-N. A Hypothesis for the Boron Hardenability Mechanism. J. W. Spretnak and Rudolph Speiser. *American Society for Metals, Preprint* no. 20, 1953. 32 p.

Importance of the allotropic transformation in determining kinetics of decomposition of austenite. Tables, graphs. 37 ref. (N6, N8, AY)

281-N. Microstructural Changes on Tempering Iron-Carbon Alloys. B. S. Lement, B. L. Averbach, and Morris Cohen. *American Society for Metals, Preprint* no. 25, 1953, 27 p.

Electron microscopic study of microstructural changes that occur in high purity Fe-C alloys during tempering up to 700° F. Tables, graphs, micrographs. (N8, J29, Fe)

282-N. Gamma Loop Studies in the Iron-Vanadium and the Iron-Vanadium-Titanium Systems. William R. Lucas and W. P. Fishel. *American Society for Metals, Preprint* no. 30, 1953, 13 p.

Dilatation studies to determine the Ac_3 transformation temperatures. Tables, graphs, photograph. 9 ref. (N8, Fe, V, Ti)

283-N. High Temperature Transformations in Ferritic Stainless Steels Containing 17 to 25% Chromium. A. E. Nehrenberg and Peter Lillys. *American Society for Metals, Preprint* no. 31, 1953, 28 p.

Studies of complex isothermal transformations which occur in both austenite and delta ferrite of commercial 17, 21 and 25% Cr steels heated sufficiently for complete solution of carbides. Table, graph, micrographs. 21 ref. (N8, SS)

284-N. Grain Growth in High Speed Steel. Eric Kula and Morris Cohen. *American Society for Metals, Preprint* no. 33, 1953, 26 p.

Formation of fish-scale fracture during re-austenizing of previously hardened steels. Graphs, micrographs. 23 ref. (N3, TS)

285-N. Discontinuous Grain Growth in High Speed Steel. Arthur H. Grobe, George A. Roberts, and D. S. Chambers. *American Society for Metals, Preprint* no. 34, 1953, 30 p.

Fish-scale fracture formation in eight commercial high speed steels. Tables, graphs, micrographs. 4 ref. (N3, TS)

286-N. Strain Aging Behavior of Rheotropically Embrittled Steel. E. J. Ripling. *American Society for Metals, Preprint* no. 35, 1953, 11 p.

Rheotropic recovery produced in a steel heat treated to a high-hardness level is shown to persist through a second tempering treatment. Graphs. 9 ref. (N4, Q23, AY)

287-N. Solution and Precipitation of Aluminum Nitride in Relation to the Structure of Low Carbon Steels. W. C. Leslie, R. L. Rickett, C. L. Dotson, and C. S. Walton. *American Society for Metals, Preprint* no. 1W, 1953, 28 p.

Temperature required for complete solution was investigated. Effects of composition, solution temperature and prior cold work on rate of isothermal precipitation. Influence of aluminum nitride on microstructure of cold rolled, box annealed sheet steel. Tables, graphs, micrographs. 12 ref. (N7, M27, CN)

288-N. Roles of Aluminum and Nitrogen in Graphitization. E. J. Dulis and G. V. Smith. *American Society for Metals, Preprint* no. 2W, 1953, 11 p.

Results of tests on cementite decomposition of eight steels. Tables, micrographs. 6 ref. (N8, CN, Al)

289-N. The Influence of Heat Treating Variables on the Martensite Transformation in SAE 1050 Steel. Melvin R. Meyerson and Samuel J. Rosenberg. *American Society for Metals, Preprint* no. 8W, 1953, 26 p.

Effects of austenitizing temperature, austenite grain size and rate of cooling. Tables, graphs, micrographs. 32 ref. (N8, CN)

290-N. The Formation of Sigma Phase in Types 309 and 310 Stainless Steel. R. C. Frerichs and C. L. Clark. *American Society for Metals, Preprint* no. 9W, 1953, 12 p.

Structural and physical changes occurring as a result of aging at elevated temperatures. Micrographs, table, diagrams. 9 ref. (N7, N8, SS)

291-N. Precipitation Hardening in Austenitic Chromium-Nickel Steels Containing High Carbon and Phosphorus. A. G. Allten, J. G. Y. Chow, and A. Simon. *American Society for Metals, Preprint* no. 10W, 1953, 25 p.

Series of 21% Cr, 12% Ni steels containing 0.3 to 0.7% C and 0.03 to 0.5% P were studied by hardness, X-ray diffraction, electrical resistivity and metallographic methods. Tables, graphs, micrographs. 18 ref. (N7, SS)

292-N. Heat Treatment of Steel Castings. John Howe Hall. *Foundry*, v. 81, Oct. 1953, p. 122-125, 264-265.

Changes which occur in metal structure that improve mechanical properties during heat treating. Micrographs, photographs, graph. 3 ref. (To be continued.)
(N general, J general, Q general, CI)

293-N. Growth Characteristics of Ingot-Mould Irons in Air and Vacuum. J. W. Grant. *Foundry Trade Journal,* v. 95, Sept. 17, 1953, p. 359-361; disc., p. 361-362.

Tests which establish that appreciable growth can take place in cast iron even in absence of oxidizing influences and gases. (N8, CI)

294-N. Growth of Single Crystals From a Melt. *Metal Industry,* v. 83, Sept. 18, 1953, p. 242.

Bridgeman method. Influence of temperature gradient and rate of growth on quality of single crystals of Bi, Pb, Sn, and Zn. 2 ref.
(N12, Sn, Pb, Zn Bi)

295-N. (French.) **Contribution to the Study of the Supersaturation of Iron by Cathodic Hydrogen.** Jean DuFlot. *Publications Scientifiques et Techniques du Ministere de l'Aire,* Paris, no. 265, 1952, 58 p.

Thorough study covering experimental conditions, role of Fe structure in cathodic charging, mechanical tests, and measurements. 42 ref. (N15, Fe)

296-N. (French.) **Diffusion of Metals Into Thin Layers Which are Obtained by Vaporization.** Pierre Michel. *Comptes rendus,* v. 237, no. 4, July 27, 1953, p. 332-333.

Formation of Ag-Sn and Ag-Zn alloys by successive vaporizations. Ag-Mg and Ag-Cu alloys could not be formed by this method. Table. 4 ref.
(N1, Ag, Sn, Zn, Mg, Cu)

297-N. (French.) **Anomalies Observed in Recrystallization of Sheets and Tubes of Copper Alloys Containing Aluminum.** J. Marechal and M. Doucet. *Revue de metallurgie,* v. 50, no. 8, Aug. 1953, p. 537-550.

Reduction in grain size between 400 and 600° C. Graphs, micrographs. (N5, Cu, Al)

298-N. (French.) **Thermo-Elastic Study and Isothermal Decomposition of Eutectoid in Aluminum Bronzes.** Rene Le Roux. *Revue de metallurgie,* v. 50, no. 8, Aug. 1953, p. 558-578.

Pearlitic, martensitic and order-disorder transformations by measurements of variations in elastic modulus during continuous cooling. Tables, graphs, micrographs, diagrams. 31 ref. (N9, N10, Cu, Al)

299-N. (German.) **Segregation Phenomena in Nickel Steels.** Klaus Jansen, Eduard Houdremont, and Werner Jellinghaus. *Archiv fur das Eisenhüttenwessen,* v. 24, nos. 7-8, July-Aug. 1953, p. 323-332.

Examples of solid-state segregation. Graphs, photographs, table. 8 ref. (N12, AY)

300-N. (German.) **Isothermal Time-Temperature Diagrams of Useful Tool Steels.** Max Kroneis, Reinhold Gattringer, Kurt Ebner, and Helmut Krainer. *Archiv fur das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 333-351.

Diagrams for 24 alloy steels. Diagrams, graphs, table. (N8, TS)

301-N. (German.) **Influence of State of Material on Hydrogen Diffusion in Unalloyed Steel.** Hermann Schumann and Friedrich Erdmann-Jesnitzer. *Archiv fur das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 353-360.

Influence of varying degrees of cold deformation and recrystallization on behavior of H_2 in low C steel. Photographs, graphs, diagrams, table. 23 ref. (N1, N5, ST)

302-N. S-Curves. E. Gillam and D. G. Cole. *Iron & Steel,* v. 26, Oct. 1953, p. 471-474.

Development of X-ray method to follow submartensitic transformations in steels. Diagrams, graphs, tables. 11 ref. (N8, ST)

303-N. Can I Benefit From the Use of Low Temperature Treatment? Howard E. Boyer. *Steel Processing,* v. 34, Oct. 1953, p. 502-508.

Low-temperature austenite transformations in steels. Tables, graphs, photographs. (N8, J2, ST)

304-N. (German.) **Recrystallization Textures of Titanium.** D. N. Williams and D. S. Eppelsheimer. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 360-362.

Textures resulting from heating pure cold rolled titanium to 800° C. and commercial cold rolled titanium to 650, 800 and 880° C. Diagrams, tables. 6 ref. (N5, Ti)

305-N. (German.) **Thermodynamics of the Transfer Processes in Ionic Mixtures and Their Application on Isotope-Containing Salts and Metals.** Alfred Klemm. *Zeitschrift für Naturforschung,* v. 8a, no. 7, July 1953, p. 397-400.

Relationship between conductivity, cationic and anionic self diffusion, and the mass effect of electrolytic migration. 4 ref. (N1)

306-N. (German.) **Self-Diffusion of Thallium in Molten Thallium Chloride.** E. Berne and A. Klemm. *Zeit-*

schrift für Naturforschung, v. 8a, no. 7, July 1953, p. 400-403.

Experimental method of measuring self-diffusion coefficients. Diagram, table, graph. (N1, Tl)

307-N. (English.) **The Growth of Strain-Anneal Crystals of Predetermined Orientation.** G. K. Williamson and R. E. Smallman. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 487-491.

Principles and method of growing crystals of any desired orientation in superpure aluminum and its alloys. Diagrams. 16 ref. (N12, Al)

308-N. (English.) **Self-Diffusion in Zinc.** G. A. Shirn, E. S. Wajda, and H. B. Huntington. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 513-518.

Radioactive zinc was used as a tracer. It is shown that at least two mechanisms are involved. Graphs, tables. 5 ref. (N1, Zn)

309-N. (English.) **Criterion for the Action of Applied Stress in the Martensitic Transformation.** J. R. Patel and M. Cohen. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 531-538.

Effects of stress on the transformation temperature were studied experimentally for iron-nickel and iron-nickel-carbon alloys under uniaxial tension, uniaxial compression and hydrostatic pressure. Table, graphs. 13 ref.
(N8, Q25, Fe, Ni, C)

310-N. (English.) **The Effects of Neutron Irradiation in the NRX Reactor on the Order-Disorder Alloy Cu_3Au.** L. G. Cook and R. L. Cushing. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 539-548.

Volume disordering was observed with fission spectrum neutrons and a secondary ordering effect was apparently induced by thermal neutrons. Tables, graphs, diagrams. 10 ref. (N10, Cu, Au)

311-N. (English.) **The Effects of Neutron Irradiation in the NRX Reactor on the Order-Disorder Alloy CuAu.** L. G. Cook and R. L. Cushing. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 549-551.

Disordering was caused by fast neutrons. Thermal neutrons apparently caused secondary ordering. Tables, graphs. (N10, Cu, Au)

312-N. (English.) **An X-Ray Investigation of Age Hardening in AlAg.** C. B. Walker and A. Guinier. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 568-577.

Experimental data confirm Guinier's explanation of the precipitation mechanism for a 20% Ag-Al alloy. Graphs, diagrams. 17 ref.
(N7, Al, Ag)

313-N. (English.) **The Diffusivity of Carbon in Iron by the Steady-State Method.** R. P. Smith. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 578-587.

Tests were made at 1000, 851 and 802° C. with different carbon contents at the cylinder surfaces. Diagrams, tables, charts. 22 ref.
(N1, Fe, C)

314-N. (German.) **The Kinetics of AuCu and $AuCu_3$.** U. Dehlinger. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 492-494.

The lower rate of disorder-order transformation in deformed crystals is explained as a function of the number of atoms in a stable nucleus. 6 ref. (N10, Au, Cu)

315-N. (German.) **Metallographic Investigations of Electrolylic Chromium Deposits.** L. Koch and G. Hein. *Metalloberfläche,* Ausgabe A, v. 7 no. 10, Oct. 1953, p. 145-148.

Hexagonal beta modifications changing to cubic modifications upon heating to room temperature or storing for prolonged periods. Micrographs, tables. 10 ref.
(N6, Cr, Cu, ST)

316-N. (Russian.) **Nonuniform Crystallization During Welding.** S. V. Avakian, N. F. Lashko, and O. P. Shlykov. *Avtogennoe Delo,* v. 24, no. 6, June 1953, p. 12-16.

Effects of cooling Al-Cu and Al-Si systems at different rates. Graphs, micrographs.
(N12, K general, Al, Cu, Si)

317-N. (Russian.) **Effect of Certain Dissolved Additions on the Frontal Diffusion of Silver in Polycrystalline Copper.** V. I. Arkharov, S. I. Ivanovskaia, and N. N. Skorniakov. *Doklady Akademii Nauk SSSR,* v. 89, no. 4, Apr. 1953, p. 669-672.

Effect of small additions of iron. Micrographs, table. (N1, Cr, Ag)

318-N. (Russian.) **Thermodynamics of Simple Carbides in Steel.** N. S. Fastov and B. N. Finkel'shtein. *Doklady Akademii Nauk SSSR,* v. 89, no. 4, Apr. 1953, p. 677-679.

Quantity and composition of carbide phase depending on composition of the steel and its thermal treatment. (N8, M27, ST)

SECTION P

PHYSICAL PROPERTIES and TEST METHODS

1-P. Superconductivity of Indium-Thallium Solid Solutions. J. W. Stout and Lester Guttman. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 703-712.

Measurements on superconducting properties of In-Tl solid solutions in composition range from pure In to 50% Tl. Magnetic induction and electrical resistance were measured at various temperatures and magnetic field strengths. Single-crystal specimens of composition 0, 5, 10, 15, and 20 atom % Tl, and polycrystalline specimens containing 15, 20, 38, and 50% Tl, were investigated. Critical fields for destruction of superconductivity are given for range 0-20% Tl and electronic heat capacities of normal metal are calculated. Graphs and tables. 10 ref. (P15, In, Tl)

2-P. The Electrical Resistivity of Indium-Thallium Solid Solutions. J. W. Stout and Lester Guttman. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 713-714.

Measurements were made in composition range from 100% In to 50 at. % Tl and from boiling point of He to room temperature. Tables. (P15, In, Tl)

3-P. Grain Boundary Barriers in Germanium. W. E. Taylor, N. H. Odell, and H. Y. Fan. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 867-875.

High resistance at grain boundaries in *n*-type Ge was investigated. Theory developed assumes existence of surface states at the boundary. Ability of barriers to withstand about 100 volts is explained. D.C. conductance of barrier, measured at different temperatures, agrees with theory in dependence on temperature as well as in order of magnitude. Results are in agreement with theory, showing that at low temperatures the current across the boundary is mainly carried by electrons, hole current becoming increasingly important as temperature is raised. Graphs. 13 ref. (P15, M26, Ge)

4-P. Interpretation of the Electron-Inertia Experiment for Metals With Positive Hall Coefficients. Norman Rostoker. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 952-953.

Author's interpretation of a previous paper which described measurements of e/m for the conduction electrons of metals such as Mo and Zn. (P15, Mo, Zn)

5-P. Changes in Electrical Properties of Cold Worked Metals. T. Hirone and K. Adachi. *Engineers' Digest,* v. 13, Nov. 1952, p. 394-395. (From *Science Reports of the Research Institute of Tohoku University,* ser. A, Vol. 3, No. 4, 1952, p. 454-458.)

Brief theoretical analysis. (P15)

6-P. A New Permanent Magnet From Powdered Manganese Bismuthide. Edmond Adams, William M. Hubbard, and Albert M. Syeles. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1207-1211.

Selection of material, history, preparation of MnBi, pulverization and separation, compaction into magnets, evaluation, and comparison with present magnets. (P17, H general, SG-n, Bi, Mn)

7-P. The Polarization of Acoustic Waves in Cubic Crystals. A. E. Fein and Charles S. Smith. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1212-1213.

Ni as a typical example is used to determine directions of particle motion associated with acoustic waves. Results are shown graphically. (P10, Ni)

8-P. Hydrogen Overvoltage on Bright Platinum. Sigmund Schuldiner. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 488-494.

Method of determining surface cleanliness of Pt cathode was developed, and Pt overvoltage curves in various concentrations of H_2SO_4 and 0.1 N K_2SO_4 were determined. Diagrams, graphs, and tables. 18 ref. (P15, Pt)

9-P. The Electrochemical Behavior of Aluminum. In Buffered and Alkaline Solutions of Potassium Ferricyanide and in Sodium Hydroxide. J. V. Petrocelli, *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 513-519.

Study of the reactivity and polarization characteristics of pure Al in buffered and alkaline solutions of $K_3Fe(CN)_6$ and in NaOH. Electrode potentials, weight loss data, and polarization curves. Analysis of polarization behavior is based on the theory of the "mixed potential." Graphs. (P15, Al)

10-P. A Polarographic Method for the Indirect Determination of Polarization Curves for Oxygen Reduction on Various Metals. III. Chromium, Molybdenum, Tantalum, Titanium, Tungsten, and Zirconium. Paul Delahay and Lee J. Stagg. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 546-548.

Presents polarization curves for O_2 reduction on Cr, Mo, Ta, Ti, W, and Zr. Appreciable amounts of H_2O_2 are formed on all except Zr and Mo.
(P15, R1, Cr, Mo, Ta, Ti, W, Zr)

11-P. Diffusion and Convection in Electrolysis. A Theoretical Review. C. W. Tobias, M. Eisenberg, and C. R. Wilke. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 359C-365C.

Diagrams. 30 ref. (P15, L17, C23)

12-P. Thermal Scattering of Light in Cubic Crystals. V. Chandrasekharan. *Journal of the Indian Institute of Science,* v. 34, sec. A, Oct. 1952, p. 269-286.

Theory for intensities of Doppler components in birefringent crystals was applied to cubic crystals and general expressions for intensities for 11 specific orientations of crystals were derived. Extensive tables. 19 ref. (P17)

13-P. The Viscosity of Aluminium and Binary Aluminium Alloys. W. R. D. Jones and W. L. Bartlett. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 145-152.

A study was made of variation of viscosity with temperature for pure Al and binary Al alloys. Results show a characteristic change point at 760-770° C. Diagrams and charts. (P10, Al)

14-P. Thermodynamic Properties of Solid Nickel-Gold Alloys. L. L. Seigle, Morris Cohen, and B. L. Averbach. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1320-1327.

Free energies, enthalpies, and entropies of mixing of Ni-Au solid solutions containing 5 to 95 atomic % Ni were determined at 700 to 900° C. Thermodynamic activities exhibit large positive deviations from Raoult's law. Enthalpies of mixing are positive (heat is absorbed) and are attributable to the lattice distortional energy resulting from size difference between nickel and gold atoms. Diagrams, tables and graphs. 25 ref. (P12, Ni, Au)

15-P. Increase of High Magnetostriction by Magnetic Anneal. H. E. Stauss and G. Sandoz. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1342-1343.

Studies were made on two alloys —87% Fe, 13% Al; and 69% Co, 31% Fe. An increase of 1.2 times was obtained. Data are tabulated.
(P16, Fe, Al, Co)

16-P. A Method of Measuring the Magnetic Permeability of Rod Specimens. H. Aspden. *Journal of Scientific Instruments,* v. 29, Nov. 1952, p. 371-374.

Method using search coil and fluxmeter. It is extended by connecting in opposition the field search coil and flux search coil so that arrangement can be used as a sensitive flux-balance indicator and so that accuracy of a permeability measurement is rendered substantially independent of fluxmeter errors. (P16)

17-P. Thermionic Constants of the Iron Group of Metals. K. S. Krishnan and S. C. Jain. *Nature,* v. 170, Nov. 1, 1952, p. 759.

Method for determination of thermionic constants of Cr, Fe, Co, and Ni, by depositing metals both electrolytically and by evaporation from a tungsten wire coated previously with the metal, or carrying small rings of the metal.
(P15, Cr, Fe, Co, Ni)

18-P. The Effect of Neutron Bombardment on the Low Temperature Atomic Heat of Silicon. P. H. Keesom, K. Lark-Horovitz, and N. Pearlman. *Science,* v. 116, Dec. 5, 1952, p. 630-631.

Experiments at Purdue with 10-mev. deuterons and at Oak Ridge with fast neutrons which indicate that irradiation produces both elec-

tron and hole traps in Si. Table. 11 ref. (P10, Si)

19-P. (Russian.) **Change of Electrical Resistance of Single Crystals of Transformer Steel in a Magnetic Field.** T. D. Zotov and Ia. S. Shur. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 267-269.

An experimental study was made on the Thomson effect in single crystals of 3.5%-Si steel. Data are charted. 11 ref. (P15, AY)

20-P. (Russian.) **Measurement of Heat Capacity of Metals at Very Low Temperatures (Cadmium From 0.3 to 0.9° K.).** B. N. Samoilov. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 281-284.

Method of determination. Data are discussed and charted. (P12, Cd)

21-P. Densities of Commonly Plated Metals. *Metal Finishing,* Guidebook-Directory Issue, 1953, p. 500.

Table. (P10, L17)

22-P. The Resistivity of Lanthanum, Cerium, Praseodymium, and Neodymium at Low Temperatures. N. R. James, S. Legvold, and F. H. Spedding. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1092-1098.

Resistivity from room temperature to 2.2° K is presented. Effect of crystal structure and purity on electrical resistivity. Graphs and tables. (P15, La, Ce, Pr, Nd)

23-P. The Specific Heat of Lead in the Temperature Range 1° K to 75° K. M. Horowitz, A. A. Silvidi, S. F. Malaker, and J. G. Daunt. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1182-1186.

Measured calorimetrically, both in the normal and superconductive states by means of a semi-automatic recording system. Tables and graphs. 16 ref. (P12, Pb)

24-P. Spin-Lattice Relaxation in Ferromagnets. Elihu Abrahams and C. Kittel. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1200.

Introduces a spin-wave field by expanding the transverse components of magnetization into normal modes and quantizing according to commutation relations between the components of atomic spin. A macroscopic phonon field is set up to describe lattice vibrations in an elastically isotopic solid. Results for Ni. (P16, Ni, Sg-n, p)

25-P. The Concept of Spin-Lattice Relaxation in Ferromagnetic Materials. P. W. Anderson. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1214.

(P16, SG-n, p)

26-P. Some Properties of Superconductors Below 1° K. III. Zr, Hf, Cd, and Ti. T. S. Smith and J. G. Daunt. *Physical Review,* ser. 2, v. 88, Dec. 1, 1952, p. 1172-1176.

Using techniques for measurement of magnetic threshold curves of superconductors below 1° K. previously employed, investigations were made on Cd, Zr, Hf, and Ti, both before and after heat treatment. Tables.

(P15, Zr, Hf, Cd, Ti)

27-P. The Isotope Effect in Superconductivity. E. Maxwell. *Physics Today,* v. 5, Dec. 1952, p. 14-18.

A recently discovered phenomenon in the behavior of superconducting elements. (P15)

28-P. Magnetostrictive Effect and the Δ-E Effect in Nickel. Henrik Nödtvedt. *Nature,* v. 170, Nov. 22, 1952, p. 884-885.

Experiments in connection with sound propagation in ferromagnetic materials. (P10, P16, Ni)

29-P. (German.) **A Relation Between the Hall Effect and the Increase of the Electrical Resistance of Bismuth at Low Temperature.** Leopold Halpern. *Zeitschrift für Physik,* v. 133, 1952, p. 524-527.

Polycrystalline bismuth at the temperature of liquid air reveals a simple relationship between the Hall constant, magnetic field strength, and resistance. Tabulated data. (P15, Bi)

30-P. (Book—German.) **(Developments in Solid State Chemistry.) Einführung in die Festkörperchemie.** J. Arvid Hedvall. 292 pages. 1952. Friedr. Vieweg & Sohn, Braunschweig, Germany. 18.20 DM.

Deals with bond types of solids, defect-type lattices, diffusion, electrical conductivity, sintering, decomposition, transformation, exchange reactions, effects of magnetic fields, light, supersonic waves and gaseous atmosphere on reactivity, and applications to practical problems. Includes 25 pages of tables. Those interested in slag-metal equilibria or powder metallurgy will find much useful information not yet widely known. (From review in *Metallurgical Abstracts)*

(P general, N general, H general)

31-P. (Book—German.) **(Fundamentals of Metallurgy. Vol. 8. Treatise on Extractive Metallurgy.) Grundlagen der Metallurgie. Band 8. Die Metallhüttenpraxis in Einzeldarstellungen.** Ch. K. Avetisian. 242 pages. 1951. Verlag Wilhelm Knapp, Halle (Saale), Germany. (Translated from the Russian by Friedrich Krantz). Paperbound, 12; Clothbound, 14 DM.

Concerned primarily with physical-chemical bases of important metal-

lurgical processes, and their use in understanding of such processes and solution of metallurgical problems. Part 2 deals with metallic state, allotropy, melting of metals, and phase equilibria. Part 3 discusses properties and behaviour of gases in relation to drying of ores and concentrates. Part 4 considers chemical processes in metallurgy, beginning with thermochemistry and law of mass action. Part 5 deals with fundamental principles of hydrometallurgical processes. (From review in *Metallurgical Abstracts)* (P12, C general, D general, N general)

32-P. (Book.) **Liquid-Metals Handbook.** Ed. 2. 270 pages. Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. $1.00.

Reference information on liquid metals as heat-transfer media. (P11)

33-P. (Book.) **The Thermodynamics of the Steady State.** K. G. Denbigh. 103 pages. 1951. Methuen & Co., Ltd., London. 6 s., 6 d.

A pocket-sized monograph comprising introduction plus chapters on: The Thomson Hypothesis Applied to Thermal Migration Phenomena; Onsager's Theory; Rate of the Entropy Increase in Natural Processes; Some Applications of the Theory; Thermal Migration, Diffusion, Potential, etc.; and Thomson's Hypothesis in Relation to the Theory of Onsager. (P12)

34-P. (Book.) **Valence.** C. A. Coulson. 1952. 338 pages. Oxford University Press, 114 Fifth Ave., New York 11, N. Y.; or Amen House, Warwick Sq., London E.C. 4, England. $5.00.

The viewpoint is quantum-mechanical throughout, using both the molecular-orbitol and valence-bond approaches, making it the most nearly complete treatment available on the subject. Conclusions are logical and not arbitrary. No great demands are made on the mathematical prowess of the reader. (From review in *Journal of the American Chemical Society)* (P10)

35-P. New Swedish Heating Material for Ceramic Kilns. John Grindrod. *Ceramics,* v. 4, Nov. 1952, p. 423-424.

Brief description of Mo alloy claimed to withstand temperatures up to 1600 or 1700° C. (P11, Mo)

36-P. The Participation of f Orbitals in Bonding in Uranium and the Transuranium Elements. Robert E. Connick and Z. Z. Hugus, Jr. *Journal of the American Chemical Society,* v. 74, Dec. 12, 1952, p. 6012-6015.

20 references. (P10, U)

37-P. A Thermodynamic Study of Liquid Metallic Solutions. V. The Systems Zinc-Bismuth and Zinc-Lead. O. J. Kleppa. *Journal of the American Chemical Society,* v. 74, Dec. 12, 1952, p. 6052-6056.

Experimental data and results. Phase diagrams. 13 ref. (P12, M24, Zn, Bi, Pb)

38-P. A Thermodynamic Study of Liquid Metallic Solutions. IV. Approximate Thermodynamic Data From the Phase Diagram for the Systems Copper-Bismuth, Copper-Lead and Copper-Thallium. O. J. Kleppa. *Journal of the American Chemical Society,* v. 74, Dec. 12, 1952, p. 6047-6051.

New method which, for certain types of phase diagrams, makes it possible to separate the calculated partial molal free energies (along the liquidus) into approximate heat and entropy terms. Method has been applied to the systems Cu-Pb, Cu-Bi and Cu-Th. Phase diagrams. 15 ref. (P12, M24, Cu, Bi, Pb, Th)

39-P. Complicated Domain Patterns on Iron-Silicon Single Crystals. C. F. Ying, S. L. Levy, and R. Truell. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1339-1345.

Domain patterns on surfaces of Fe-Si single crystals were observed between successive electrolytic or mechanical polishings. Micrographs. (P16, Fe, Si)

40-P. High-Frequency Calibration of Magnetic Materials. *Journal of the Franklin Institute,* v. 254, Dec. 1952, p. 534-536.

Calibration service by National Bureau of Standards for determining r-f permeability and loss factor of magnetic materials in frequency range between 50 kc. and 30 Mc. (P16, SG-n, p)

41-P. Iron-Carbon-Sulphur Melts. D. A. Spratt and J. A. Kitchener. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 383-386.

Relationship between C and S in iron melts. Micrographs. 20 ref. (P12, Fe)

42-P. Irreversible Phenomena in Metallurgy. R. A. Oriani. *Journal of Physical Chemistry,* v. 56, Dec. 26, 1952, p. 1025-1030.

Applications of thermodynamics to identifying proper forces and fluxes and in elucidating cross-effects when more than one force is operating. Diagrams. 35 ref. (P12)

43-P. Chemical Behavior of Sulphur in Iron and Steelmaking. John Chipman. *Metal Progress,* v. 62, Dec. 1952, p. 97-107.

Studies on openhearth slags, blast furnace slag data, reaction of S with

H_2, computation of activity coefficient, chemistry of desulphurizing action, and transfer rate of S. Graphs and diagrams. 20 ref. (P12, D general, CI, ST)

44-P. Magnetic Properties of Stainless Steel Wire. Effect of Cold Work. W. Sucksmith. *Metal Treatment and Drop Forging,* v. 19, Dec. 1952, p. 545-546, 549.

Magnetic properties which are factors in efficient recording of sound on wire. Effect of cold working and heat treatment. (P16, J general, SS)

45-P. Hall Effect in Zinc Crystals at Low Temperatures. John K. Logan and Jules A. Marcus. *Physical Review,* ser. 2, v. 88, Dec. 15, 1952, p. 1234-1238.

Experimental study. For each crystal, one component of Hall field was measured for fixed crystallographic orientation of current density, and for various orientations of magnetic field in plane perpendicular to current density. Graphs and diagrams. 14 ref. (P15, Zn)

46-P. Energy Levels in Magnesium, Vanadium, Chromium, and Manganese. H. J. Hausman, A. J. Allen, J. S. Arthur, R. S. Bender, and C. J. McDole. *Physical Review,* ser. 2, v. 88, Dec. 15, 1952, p. 1296-1299.

Targets of Mg, V, Cr, and Mn were bombarded by 8-Mev protons from 47-in. cyclotron and reaction particle observed at an angle of 150° to incident beam. Graphs. (P15, Mg, V, Cr, Mn)

47-P. Experimental Verification of the Relationship Between Diffusion Constant and Mobility of Electrons and Holes. *Physical Review,* ser. 2, v. 88, Dec. 15, 1952, p. 1368-1369.

Relationship between diffusion constant and mobility was experimentally verified for electrons and holes in Ge by measuring rate of increase in half concentration width of a pulse of minority carriers moving in an electric field. (P15, N1, Ge)

48-P. Optical and Infrared Reflectivity of Metals at Low Temperatures. T. Holstein. *Physical Review,* ser. 2, v. 88, Dec. 15, 1952, p. 1427-1428.

Brief mathematical analyses. (P17)

49-P. (English.) Relationship Between the Transverse Magnetogalvanic Effects and Resistivity. A. L. Perrier. *Helvetica Physica Acta,* v. 25, No. 6, 1952, p. 615-618.

Formulas and various aspects of the isothermic Hall effect from the physics viewpoint. (P15)

50-P. (Russian.) Influence of Size on the Critical Field of the Second Group. A. A. Abrikosov. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 21, 1952, p. 489-492.

Experiments were made on the influence of layer thickness for Tl and Sn. Data are charted. (P15, Tl, Sn)

51-P. (Russian.) Investigation of Superconducting Properties of Thallium and Tin Films Condensed at Low Temperatures. N. V. Zavaritskii. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 21, 1952, p. 501-504.

An experimental study. Deposits were made at 80 and 2° K. Data are tabulated and charted. (P15, Tl, Sn)

52-P. Some Properties of Tin—II Sulfate Solutions and Their Role in Electrodeposition of Tin. I. Solutions With Only Tin—II Sulfate Present. C. A. Discher. *Journal of the Electrochemical Society,* v. 100, Jan. 1953, p. 45-51.

Density, refractive index, surface tension, viscosity, freezing point depression, conductivity, transference number, electrode potential to pure Sn and H_2, respectively, were measured for various aqueous tin-II sulfate solutions. Relationship between concentration and magnitude of these properties, and various derived properties, are discussed. Inferences are drawn with respect to structure of species in solution. Graphs. 5 ref. (P general, L17, Sn)

53-P. Density and Hydrogen Occlusion of Some Ferrous Metals. J. H. Keeler and H. M. Davis. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 44-48.

Low-metalloid rimmed ingot iron, a rimmed steel of SAE 1020 grade, and a high-purity iron were heat treated in purified H_2 in an air-tight furnace. Results. Graphs and tables. 26 ref. (P10, N1, Fe, CN)

54-P. On the Magnetic Shunt Characteristics of Fe-Ni-Cr Alloys and M. S. Alloy. Hakaru Masumoto, Yuki Shirakawa, and Toru Ohara. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 237-245.

Investigation was made of Fe-Ni-Cr alloys in order to improve magnetic shunt properties with a view of obtaining alloys having less Ni than Monel type Ni-Cu alloys and more reproductivity than Fe-Ni alloys. Tables and graphs. 6 ref. (P16, Fe, Ni, Cr, Cu)

55-P. On the Thermal Expansion, Rigidity Modulus and Its Temperature Coefficient of the Alloys of Cobalt, Iron and Vanadium and a New

Alloy "Velinvar". Hakaru Masumoto, Hideo Saito, and Takeo Kobayashi. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 255-260.

Results of investigation. Tables and graphs. (P11, Q23, Co, Fe, V)

56-P. A Mechanism of Spin-Lattice Relaxation in Ferromagnetic Substances. Tokutaro Hirone and Noboru Tsuya. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 261-267.

Mathematical analysis. 11 ref. (P16, SG-n, p)

57-P. Electrical Properties of Antimony-Doped Tellurium Crystals. Tadao Fukuroi, Seiichi Tanuma, and Shotaro Tobisawa. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 283-297.

Electrical resistivity, Hall effect, and thermo-electric power of Te crystals alloyed with Sb were measured from liquid air temperature to 300° C., and data are compared with properties of pure Te crystals with a view to clarifying change of electrical properties accompanying increase of acceptor impurities. Tables, graphs, and diagrams. 7 ref. (P15, Te, Sb)

58-P. Solubility of Nitrogen in Iron-Chromium Alloys. K. T. Kurochkin, P. V. Gel'd, and V. I. Iavoiskii. Henry Brutcher Translation 2936, 8 pages.

Previously abstracted from original in *Doklady Akademii Nauk SSSR.* See item 457-P, 1952. (P13, Fe)

59-P. (French.) **Secondary Electronic Emission of Some Metals Under the Impact of Positive Lithium Ions.** Georges Couchet. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Oct. 17, 1952, p. 944-946.

Experimental arrangement. Results obtained with duralumin, stainless steel, and Mumetal. (P15, Al, SS, Ni)

60-P. (German.) **On the Question of Electron Emission of Cold Worked Metals.** Werner Pepperhoff. *Zeitschrift für Metallkunde,* v. 43, Nov. 1952, p. 402-403.

Electron emission occurring as an after-effect of mechanical treatment on metallic surfaces causes a blackening of photographic layers. Photographs. 5 ref. (P15)

61-P. (Book.) **An Advanced Treatise on Physical Chemistry. Vol. 3. The Properties of Solids.** J. R. Partington. 639 pages. 1952. Longmans, Green and Co., 43 Albert Dr., London, S.W.19, England.

General properties of solids, crystals, crystal lattices and space groups, isomorphism, density, elastic properties, tensile strength, hardness, surface energy, viscosity, thermal expansion, specific heats, theory of solid state, thermal conductivity, and fusion. Mathematical appendix on vectors and tensors, complex variable, and calculus of variations. (P general, M26, Q general)

62-P. (Book-German.) **(Magnetic Materials.) Magnetische Werkstoffe.** Franz Pawlek. 303 pages. 1952. Springer-Verlag, Berlin, Germany.

Data on properties and applications of permanent magnets; soft magnetic materials; materials with special magnetic and mechanical properties; and nonmagnetic materials. (P16, SG-n, p)

63-P. (Book.) **Structure of Metals. Ed. 2.** Charles S. Barrett. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. $10.00.

Deals with atomic arrangement in metals, solid and liquid. Extensive revisions of sections concerning dislocations, imperfections, creep, structures of solid and liquid metals and alloys, textures and transformations. (M general, N general, P general)

64-P. The Thermal Conductivity of Metals at Low Temperatures. J. L. Olsen and H. M. Rosenberg. *Advances in Physics,* v. 2, Jan. 1953, p. 28-66.

Theory of the electronic thermal conductivity, experimental work on thermal conductivity in the normal state, lattice conductivity, effect of a magnetic field on thermal conductivity, thermal conductivity of superconductors, and experimental techniques. Graphs. 50 ref. (P11)

65-P. On θ Values in Metals. F. M. Kelly and D. K. C. MacDonald. *Canadian Journal of Physics,* v. 31, Jan. 1953, p. 147-164.

Evaluation of Debye characteristic temperature and of characteristic temperature which appears in quantum theory of electrical resistance; compares critically different methods of evaluating them. Data on lighter alkali metals Li, Na, and K are analyzed. Tables and graphs. 33 ref. (P15, M22, Li, Na, K)

66-P. X-Ray Evidence for Metal-to-Metal Bonds in Cupric and Chromous Acetate. J. N. Van Niekerk and F. R. L. Schoening. *Nature,* v. 171, Jan. 3, 1953, p. 36-37.

Brief discussion. (P13)

67-P. Electronic Energy Bands in Metals. G. Parzen. *Physical Review,* ser. 2, v. 89, Jan. 1, 1953, p. 237-243.

Method for calculating energy levels of a crystal is based on finding

a variational principle for energy levels in terms of Wannier functions instead of usual Bloch wave functions. Results are compared with results of method of orthogonal plane waves for same problem. (P15)

68-P. The Hall Effect of Copper-Nickel Alloys. Albert I. Schindler and Emerson M. Pugh. *Physical Review,* ser. 2, v. 89, Jan. 1, 1953, p. 295-298.

Ordinary and extraordinary Hall effects were measured at room temperatures for Ni-Cu alloys. Compares results with previous predictions. Graphs. (P15, Cu, Ni)

69-P. Determination of the Surface Energy of a Metal by Molecular Orbitals. G. R. Baldock. *Proceedings of the Physical Society,* v. 66, sec. A, Jan. 1, 1953, p. 2-12.

Electronic binding energy of a monovalent metal is calculated by means of molecular approximation for simple cubic lattice in 1, 2, and 3 dimensions, and for body-centered cubic lattice, in terms of resonance integral β. 16 ref. (P12)

70-P. Thermionic Constants of Metals and Semiconductors II. Metals of the First Transition Group. S. C. Jain and K. S. Krishnan. *Proceedings of the Royal Society,* v. 215, ser. A, Dec. 22, 1952, p. 431-437.

Saturation vapor pressure of electron gas in a graphite chamber at various temperatures and the Clausius-Claperyron thermodynamic relation can be used to determine constants of most metals. Inner walls of graphite chamber were coated with a thick layer of the metal. Data for metals of the Fe group from Ti-Ni are reported. (P15, Ti, V, Cr, Mn, Fe, Co, Ni)

71-P. Magnetostriction. E. W. Lee. *Science Progress,* v. 41, Jan. 1953, p. 58-77.

Theoretical discussion. (P16)

72-P. (French.) **The Hall Effect and the Temperature of Ferromagnetic Conductors.** J. P. Jan. *Helvetica Physica Acta,* v. 25, Dec. 1952, p. 677-700.

Variation of Hall effect from 190-600° C. was studied for Fe and Ni using a number of variables. Both field and magnetization effects were considered. Theoretical analysis of the data. Results are tabulated and charted. 26 ref. (P15, Ni, Fe)

73-P. (German.) **The Optical Constants of Gold and Silver in Ultra-Violet Light.** Hermann Kober. *Annalen der Physik,* v. 11, no. 1, 1952, p. 12-14.

A highly sensitive method of measuring optical constants on vapor-deposited Au and Ag reflecters. Data are tabulated. 2 ref. (P17, Au, Ag)

74-P. (German.) **Quantum Theory of a New Cause of Ferromagnetism.** G. Heber. *Annalen der Physik,* v. 11, no. 1, 1952, p. 48-50.

Mutual effects of the 4*s* and 3*d* electrons in ferromagnetic materials using the spin-wave energies to determine, by static method, spontaneous magnetization and the total energy. 6 ref. (P16, SG-n, p)

75-P. (German.) **A Treatise on the Electrochemistry of Active Iron.** Jean D'Ans and Wa. Breckheimer. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physicalische Chemie,* v. 56, no. 7, 1952, p. 585-594.

Dependence of Fe potential on concentration of H ions, Fe (II) ions, and anions was investigated. Three relationships were explained by Fe and H_2 acting as an alloy. 21 ref. (P15, Fe)

76-P. (German.) **On the Behavior of Electrical Resistance of the Intermetallic Compound Mg_2Pb in the Vicinity of the Melting Point.** A. Knappwost. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physicalische Chemie,* v. 56, no. 7, 1952, p. 594-598.

Mg_2Pb showed abnormal decrease of its electrical resistance at the melting point. Explanation was that heteropolar components disappear in favor of metallic bonds. 15 ref. (P15, Mg, Pb)

77-P. (German.) **Heats of Formation of Li and Zr Chlorides.** H. Siemonsen and U. Siemonsen. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physicalische Chemie,* v. 56, no. 7, 1952, p. 643-644.

Heat effect of chlorination of Li and Zr was measured in a calorimetric bomb. The results are compared critically with older values. Refs. (P12, Li, Zr)

78-P. (German.) **Formation of Electrochemical Potential at Metal-Electrolyte Interfaces.** Wolfgang Lorenz. *Zeitschrift für Naturforschung,* v. 7a, Nov. 1952, p. 750-752.

Different potentials are explained by atoms in deposits with different crystallographic orientations having different bonds to the crystal lattice and to the electrolyte. (P15)

79-P. Surface Properties of Germanium. Walter H. Brattain and John Bardeen. *Bell System Technical Journal,* v. 32, Jan. 1953, p. 1-41.

Contact potential and change of contact potential with illumination of several Ge surfaces were meas-

ured. Results are direct evidence for existence of a space charge layer at free surface of a semiconductor. Graphs. 8 ref. (P15, Ge)

80-P. Forces Acting on Superconductors in Magnetic Fields. I. Simon. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 19-24.

Forces acting on a superconducting body in a magnetic field may be obtained by analogy with hydrodynamics, considering similarity of the force field around a perfect diamagnetic with the flow field of an ideal liquid past an impermeable body of the same shape. Two types of magnetic support for a sphere are described. Dissipation of energy in a rotating sphere by eddy currents and by viscous drag of the surrounding gas was studied. Diagrams. 12 ref. (P16)

81-P. Free Surface Properties of Explosive-Driven Metal Plates. R. G. Shreffler and W. E. Deal. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 44-48.

Photographic technique for study of free surfaces under acceleration by high explosives. Methods for reducing the data from the photographic record. Specific results using brass plates driven by Composition B explosive. Photographs and graphs. (P10, Cu)

82-P. Thermionic Emission from Oxide-Coated Tungsten Filaments. C. P. Hadley. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 49-52.

Work included projection tube studies, retarding field measurements, accelerating field measurements, and X-ray diffraction study of the coating. Graphs. 7 ref. (P15, W)

83-P. T^2 Dependence of the Low Temperature Specific Heat of Gallium. Warren De Sorbo. *Journal of Chemical Physics,* v. 21, Jan. 1953, p. 168.

Brief description. Graph. 8 ref. (P12, Ga)

84-P. Determination of the Absolute Grain Boundary Energy of Gold at 1300° K. F. H. Buttner, H. Udin, and J. Wulff. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 313-317.

Introduces a method whereby general grain boundary energy of metals in equilibrium at high temperatures can be found, assuming average surface energy of material is known for the same temperature. Diagrams. 37 ref. (P12, Au)

85-P. The Electrical Resistances of Alloys of a Noble Metal and a Transition Metal. A. N. Gerritsen and J. O. Linde. *Physica,* v. 18, Nov. 1952, p. 877-890.

Analysis of change of resistivity per atom per cent solute as a function of temperature underlines similarity among binary alloys with Mn and Cr as a second component in comparison with Zn as a solute. Results indicate that anomalous behavior is characteristic for contamination of a noble metal by a transition metal. Tables and graphs. 23 ref. (P15, Mn, Cr, Zn)

86-P. Neutron Capture γ-Rays From Titanium, Chromium, Iron, Nickel, and Zinc. B. B. Kinsey and G. A. Bartholomew. *Physical Review,* ser. 2, v. 89, Jan. 15, 1952, p. 375-385.

Neutron capture γ-rays emitted by even-charge elements, from Ti to Zn, have been investigated with aid of a pair spectrometer. Graphs and tables. 27 ref. (P13, Ti, Cr, Fe, Ni, Zn)

87-P. Neutron Capture γ-Rays From Scandium, Vanadium, Manganese, Cobalt, and Copper. G. A. Bartholomew and B. B. Kinsey. *Physical Review,* ser. 2, v. 89, Jan. 15, 1953, p. 386-395.

More detailed pair spectrometer measurements of neutron capture γ-rays produced by Sc, V, Mn, Co, and Cu were made. Tables and graphs. 34 ref. (P13, Sc, V, Mn, Co, Cu)

88-P. Collective Electron Ferromagnetism. A Generalization of the Treatment and an Analysis of Experimental Results. K. L. Hunt. *Proceedings of the Royal Society,* ser. A, v. 216, Jan. 7, 1953, p. 103-117.

Detailed comparison with experiment of temperature variation of electronic specific heat, spontaneous magnetization, and magnetocaloric temperature change accompanying changes in external field. Ni, Ni-Co, and Ni-Cu alloys were used. Graphs. 14 ref. (P16, Ni, Co, Cu)

89-P. Some Magnetic Properties of Metals. V. Magnetic Behavior of a Cylindrical System of Electrons for all Magnetic Fields. R. B. Dingle. *Proceedings of the Royal Society,* ser. A, v. 216, Jan. 7, 1953, p. 118-142.

Wentzel-Kramers-Brillouin method is used to solve Schrödinger equation for an electron moving in a uniform magnetic field, boundary of system being a cylinder with its axis lying along direction of field. Steady (nonperiodic) contributions to magnetic susceptibility are derived for all fields in both low and high-temperature limits, and for

most fields at intermediate temperatures. 7 ref. (P16)

90-P. Induction and Dielectric Heating. Physical Constants of Metals. *Welding Engineer,* v. 38, Feb. 1953, p. 51.

Tabulated information. (P11, P15)

91-P. (French.) **The Influence of Oxygen in Solid Solution in High Purity Iron on Certain Magnetic Properties in Weak Alternating Fields.** Jean Bourrat, Georges Chaudron, and Israel Epelboin. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Nov. 24, 1952, p. 1290-1292.

Experimental arrangement and results of magnetic measurements on four irons, annealed under pure and dry electrolytic H_2. Data are charted. (P16, Fe)

92-P. (French.) **Contribution to the Study of Pyrophoric Metals. The Oxidation of Cerium and Uranium Metals. Part I.** Jean Loriers. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 801-810; Dec. 1952, p. 883-905.

Relation between pyrophoricity of metals and their ignition points. A study was also made of Ce oxidation and the nature and structure of the oxidation products. 97 ref. (P11, Ce, U)

93-P. (French.) **Thermodynamic Calculations on the Nature of Guimer-Preston Zones in Al-Cu Alloys. J. L.** Meijering. *Revue de Métallurgie,* v. 49, Dec. 1952, p. 906-910.

Theoretical calculations are compared with experimental data. 15 ref. (P12, Al, Cu)

94-P. Magnetic Properties Below 1° K. D. de Klerk. *Physics Today,* v. 6, Feb. 1953, p. 4-9.

Magnetic properties found in some metallic salts showing Curie points at very low temperatures (below 1° K.). 16 ref. (P16, Fe)

95-P. (English.) **The Paramagnetic Susceptibility of AuFe Alloys.** Ebbe Kronqvist. *Arkiv för Fysik,* v. 5, no. 5-6, 1952, p. 453-458.

Theoretical discussion. (P16, Au, Fe)

96-P. (English.) **On the Emission of Sound Waves From an Electron in a Metal and the Theory of Superconductivity.** O. Klein. *Arkiv för Fysik,* v. 5, no. 5-6, 1952, p. 459-469.

Theoretical discussion. (P15)

97-P. (Book.) **Bibliography and Abstracts on Electrical Contacts. 1835-1951. Ed. 2.** 266 pages. Nov. 1952. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $5.50.

Bibliography to develop standards for electrical contact materials and to determine effect of variables upon performance. Includes articles on contact materials, methods of testing and on interruption of electrical circuits. Over 1500 references, hundreds of abstracts, and many special articles. (P15, T1, SG-r)

98-P. Butterfly Curve Tracer for Magnetic Materials. George M. Ettinger. *Electronics,* v. 26, Mar. 1953, p. 119-121.

Instrument meets needs for rapid and accurate means of determining properties of magnetic materials in expanding use of saturable reactors. Diagrams. 6 ref. (P16)

99-P. Adsorption of Calcium and Sodium on Pyrite. A. M. Gaudin and W. D. Charles. *Mining Engineering,* v. 5, Feb. 1953, p. 195-200.

Work includes evaluation of effect of dissolved O_2; concentration of Ca, Na, and H_2; and anions present on adsorption of Ca and Na. Graphs and tables. 13 ref. (P13, B14, Ca, Fe)

100-P. Effects of Water Vapour on the Electrical Properties of Anodized Aluminium. F. Ansbacher and A. C. Jason. *Nature,* v. 171, Jan. 24, 1953, p. 177-178.

Experiments on change of capacity in condensers. (P15, Al)

101-P. Electron-Induced Showers in Copper. Asher Kantz and Robert Hofstadter. *Physical Review,* v. 89, Feb. 1, 1953, p. 607-617.

Experimental determination was made of radial and longitudinal distribution of energy produced in showers initiated by electrons of 118 Mev and 157 Mev in Cu. A CsBr(Tl) crystal coupled to a thin light pipe and photomultiplier was used as a probe. Graphs of radial distributions are given from which curves are determined. 14 ref. (P15, Cu)

102-P. Magnetic Crystal Anisotropy and Magnetostriction of Iron-Nickel Alloys. R. M. Bozorth and J. G. Walker. *Physical Review,* v. 89, Feb. 1, 1953, p. 624-628.

Single crystals of Fe-Ni alloys were prepared and measurements made of magnetic crystal anisotropy. Magnetostriction at saturation in different crystallographic directions dependent on rate of cooling of specimens after annealing was measured. Graphs. 18 ref. (P16, Fe, Ni)

103-P. Some Properties of Superconductors Below 1° K. T. S. Smith, W. B. Gager, and J. G. Daunt. *Physical Review,* v. 89, Feb. 1, 1953, p. 654.

Ti as a crystal bar was used in the experiments. (P15, Ti)

104-P. (German.) **Contribution to the Potential-pH Diagram of Cadmium in**

Solutions Containing Chloride. W. Feitknecht and R. Reinmann. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 93-101; disc., p. 101.

Modifications of pH solubility and potential-pH diagrams, which are brought about by the fact that in several divalent metals, such as Cu, Zn, Cd, and Pb, anions of the solutions may enter into reaction while forming basic salts. Tables and graphs. 9 ref. (P15, Cd, Cu, Zn, Pb)

105-P. (French.) **Electrochemical Potentials of Niobium, Tantalum, and Protactinium in Hydrofluoric Solution.** M. Haissinsky. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 222-224; disc., p. 224.

Brief theoretical discussion. (P15, Cb, Ta, Pa)

106-P. (French.) **Critical Potentials of Electrolytic Deposits in the Radioactive Indicators Scale.** M. Haissinsky. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 214-220; disc., p. 220-221.

Summarizes experimental results. Tabular data. 26 ref. (P15, Pb, Ag, Zn, Po)

107-P. Hall Effect Modulators and "Gyrators" Employing Magnetic Field Independent Orientations in Germanium. W. P. Mason, W. H. Hewitt, and R. F. Wick. *Journal of Applied Physics,* v. 24, Feb. 1953, p. 166-175.

Uses for Hall effect in Ge crystals include measuring magnetic flux, producing pure product modulator, and in nonreciprocal transmission. Photographs and diagrams. (P15, Ge)

108-P. Physical Adsorption on Single Crystal Zinc Surfaces. T. N. Rhodin. *Journal of Physical Chemistry,* v. 57, Feb. 1953, p. 143-148.

Adsorption studies on Cu were extended to nitrogen and argon adsorption on single-crystal Zn surfaces. Differences in adsorption between a monatomic and a diatomic gas on each of two metal surfaces with same crystallography but with different atomic spacings and hence different surface electron configurations. Graphs. 28 ref. (P13, Cu, Zn)

109-P. Alteration of Surface Properties of Gold and Silver as Indicated by Contact Angle Measurements. F. E. Bartell and J. T. Smith. *Journal of Physical Chemistry,* v. 57, Feb. 1953, p. 165-171; disc., p. 171-172.

Determines and correlates tension or energy differences for Ag and Au surfaces exposed to various vapors, gases and liquids. Diagrams and tables. (P13, Au, Ag)

110-P. Adsorption Studies on Metals. I. Physical and Chemical Adsorption of Gases on Molybdenum. F. H. Healey, J. J. Chessick, and A. C. Zettlemoyer. *Journal of Physical Chemistry,* v. 57, Feb. 1953, p. 178-182.

Heterogeneous nature of Mo powder surface, both before and after reduction of surface oxide, was studied by measurements of physical and chemical adsorption of gases. Procedure for reduction and degassing of Mo powder was developed which gives a metal surface apparently free of chemisorbed O_2 and H_2. Tables and graphs. 9 ref. (P13, Mo)

111-P. The Anodic Behavior of Antimony. S. E. S. El Wakkad and A. Hickling. *Journal of Physical Chemistry,* v. 57, Feb. 1953, p. 203-206.

Study of anodic polarization of Sb in acid and alkaline solutions. Graphs. 14 ref. (P15, Sb)

112-P. Paramagnetic Relaxation in Metals. Albert W. Overhauser. *Physical Review,* v. 89, Feb. 15, 1953, p. 689-700.

Paramagnetic relaxation time of electron spins in a metal is calculated. Relaxation processes due to interaction with lattice vibrations, nuclear spins, other electrons, and impurity atoms are treated. (P16)

113-P. An Anomalous Critical Current Effect in Superconducting CbN. Floyd C. Haley and Donald H. Andrews. *Physical Review,* v. 89, Feb. 15, 1953, p. 821-823.

Observations were made of 30 transitions from normal to superconducting state occurring in four samples of CbN over a range of current from 0.01 ma to 10 ma. 12 ref. (P15, Cb)

114-P. The Thermal Expansion of Solids. J. S. Dugdale and D. K. C. MacDonald. *Physical Review,* v. 89, Feb. 15, 1953, p. 832-834.

Brief theoretical analysis. (P11)

115-P. Combined Pairs of Vacancies in Copper. J. H. Bartlett and G. J. Dienes. *Physical Review,* v. 89, Feb. 15, 1953, p. 848-850.

Approximate theoretical calculation is given for the dissociation energy of vacancy pairs in Cu and of the activation energy required for motion of associated pairs. 13 ref. (P12, Cu)

116-P. Measurement of Magnetostriction in Single Crystals. R. M. Bozorth and R. W. Hamming. *Physi-*

cal Review, v. 89, Feb. 15, 1953, p. 865-869.

Simplified procedure for determining five magnetostriction constants of a ferromagnetic cubic crystal. Constants were determined for single crystals of Ni and a Ni-Fe alloy. Tables and graphs. (P16, Fe, Ni)

117-P. (French.) The Spectroscopic Factors of Ferromagnetic Nickel-Copper Alloys. A. Jean-Pierre Meyer. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Dec. 1, 1952, p. 1382-1384.

Proposes a formula which makes it possible to calculate a spectroscopic Landé factor by determining the ferromagnetic resonance. Results are tabulated and discussed. (P16, Ni, Cu)

118-P. Standard Electrode Potential of the Iron-Ferrous Ion Couple at 25°. W. A. Patrick and W. E. Thompson. *Journal of the American Chemical Society,* v. 75, Mar. 5, 1953, p. 1184-1187.

Experimental proof of the existence of atomic hydrogen in Fe as the principal cause of the variations in the standard potential of the Fe, Fe^{++} half-cell. Diagrams and graphs. (P15, Fe)

119-P. High Temperature Heat Contents of Hafnium Dioxide and Hafnium Tetrachloride. Raymond L. Orr. *Journal of the American Chemical Society,* v. 75, Mar. 5, 1953, p. 1231-1232.

Presents table of smooth heat content and entropy increment data above 298.16° K. Heat content equations are used to represent the data. (P12, Hf)

120-P. The Electrochemistry of Gallium. William M. Saltman and Norman H. Nachtrieb. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 126-130.

Work to determine standard electrode potential for the gallium-gallic ion. 19 ref. (P15, Ga)

121-P. The Thermal and Magnetic Properties of Palladium-Silver Alloys. F. E. Hoare, J. C. Matthews, and J. C. Walling. *Proceedings of the Royal Society,* v. 216, ser. A, Feb. 24, 1953, p. 502-515.

Magnetic susceptibilities were measured for a series of Pd-Ag alloys from pure Pd to approximately 50 atomic % Ag, over a range of temperature from 20 to 290° K. Graphs and tables. 16 ref. (P16, Ag, Pd)

122-P. An Experimental and Theoretical Study of the Relation Between Magnetic Field and Current in a Superconductor. A. B. Pippard. *Proceedings of the Royal Society,* v. 216, ser. A, Feb. 24, 1953, p. 547-568.

Shows that the penetration depth in superconducting tin at 0° K can be varied by the addition of an impurity. Graphs. 24 ref. (P16, Sn)

123-P. (German.) Magnetic Investigations of Diffusion in the Cu-Fe System. A. Knappwost. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 56, No. 8, 1952, p. 840-846.

Diffusion of Fe in supersaturated Cu-Fe mixed crystals at 300° C. was investigated. Increase of paramagnetic susceptibility of alloys during tempering was observed to stem from the Fe atoms. 10 ref. (P16, N1, Fe, Cu)

124-P. (Book.) The Molecular Theory of Fluids. Herbert S. Green. 264 pages. 1952. Interscience Publishers, 250 Fifth Ave., New York 1, N. Y.

Includes statistics of molecular motion, structure of fluids at rest, condensation, liquid state, structure of fluids in motion, complex fluids, fluid mixtures, equilibrium properties, kinetic theory, and quantum theory of fluids. (P10)

125-P. (Book.) Physical Constants of Some Commercial Steels at Elevated Temperatures. The British Iron and Steel Research Association, Metallurgy (General) Division, Thermal Treatment Sub-Committee, editors. 38 pages. Butterworth's Scientific Publications, Ltd. 4-6 Bell Yard, Temple Bar, London W. C. 2, England. 21s 0d.

Tabulates specific and total heats between 50 and 1200° C; coefficient of thermal expansion (between 0 and t° C.) up to 1100° C.; electrical resistivities between 0 and 1300° C.; thermal conductivities between 0 and 350° C.; mean coefficients of thermal expansion between t° and (t + 50)° C.; densities at elevated temperatures; and thermal diffusivities. Total heat-temperature graphs are given for ranges of temperature covering transformations. (P11, P12)

126-P. (Book.) Proceedings of the General Discussion on Heat Transfer. Sept. 1951. 496 pages. 1952. Institution of Mechanical Engineers, London.

Consists of 97 papers presented in London at the joint meeting of the Institution of Mechanical Engineers and the American Society of Mechanical Engineers. General sections include heat transfer with change of state; heat transfer between fluids and surfaces; conduction in solids and fluids; radiation, instrumentation, measurement techniques, and analogies; and special problems. Pertinent papers are abstracted separately. (P11, P12)

127-P. Thermodynamic Study of Dilute Solutions of Carbon in Molten Iron. F. D. Richardson and W. E. Dennis. *Transactions of the Faraday Society,* v. 49, Feb. 1953, p. 171-180.

Equilibria between CO + CO_2 gas mixtures and C dissolved in molten iron were measured between 1560 and 1760° C. Results were used for calculating activities, partial molar heats, and entropies. Tables and graphs. 17 ref. (P12, Fe)

128-P. The Adsorption of Oxygen and Other Gases on Copper. R. M. Dell, F. S. Stone, and P. F. Tiley. *Transactions of the Faraday Society,* v. 49, Feb. 1953, p. 195-201.

Effect of heat treatment. Results discussed with reference to Russell's work on poisoning of Cu catalysts. 19 ref. (P13, Cu)

129-P. Magnetic Susceptibility of an Austenitic Steel. Z. A. Sviridova and G. V. Estulin. Henry Brutcher Translation 2961, 5 pages.

Previously abstracted from *Zhurnal Tekhnicheskoi Fiziki.* See item 3-B-18, 1949. (P17, SS)

130-P. (German.) **Measurement of Material Constants of Ferromagnetic Substances.** Alfons Hersping. *Frequenz,* v. 6, Dec. 1952, p. 345-356.

Measurement of material constants of ferromagnetic metal oxides by concentric coils. Equations are derived. Influence of an air space between sample and circuit, as well as influence of peripheral layers is computed. 13 ref. (P17)

131-P. Dynamic Hysteresis Loops of Several Core Materials Employed in Magnetic Amplifiers. Harold W. Lord. *Communication and Electronics,* Mar. 1953, p. 85-88.

Method used for obtaining loops. Graphs and diagrams. (P16, SG-n)

132-P. Preparation and Reactions of Carbonitrides on Iron. W. Keith Hall, W. E. Dieter, L. J. E. Hofer and Robert B. Anderson. *Journal of the American Chemical Society,* v. 75, Mar. 20, 1953, p. 1442-1447.

Preparation and reactions were studied from 250 to 450°. Compares results with those obtained by Jack. Tables and graphs. 23 ref. (P13, Fe)

133-P. Vapor Pressures of Inorganic Substances. IX. Gallium. Rudolph Speiser and Herrick L. Johnston. *Journal of the American Chemical Society,* v. 75, Mar. 20, 1953, p. 1469-1470.

Vapor pressure was determined by measuring rate of effusion of the vapor through an orifice. Tables. (P12, Ga)

134-P. Theory of the Faradaic Admittance. II. Analysis of the Current-Interrupter Method. David C. Grahame. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 257-261.

Theory of current-interrupter method of studying impedance of metal-solution interfaces is examined. Method is outlined to present results of current-interrupter studies in compact form. (P15)

135-P. Charging Processes on Anodic Polarization of Titanium. Colby D. Hall, Jr. and Norman Hackerman. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 262-268.

Measurement of cathodic and anodic polarization of Ti. Graphs. 12 ref. (P15, Ti)

136-P. The Effect of Ultrasonic Waves on Hydrogen Overvoltage. Ernest Yeager, T. S. Oey, and Frank Hovorka. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 268-275.

Investigation at 300 kc. per sec. in terms of a bright Pt surface. Polarization measurements were made indirectly with an electronic commutator and gated potentiometer. Diagrams. 16 ref. (P15, Pt)

137-P. Electrode Phenomena and the Thermodynamics of Irreversible Processes. Pierre Van Rysselberghe. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 275-280.

Concepts of uncompensated heat, power of irreversibility, entropy production, and affinity of irreversible chemical reactions are extended to irreversible electrochemical processes. Concept of power of polarization is introduced and its connection with electrochemical affinity and overvoltage is developed and discussed. 14 ref. (P12, P15)

138-P. Liquid Metals. I. The Viscosity of Mercury Vapor and the Potential Function for Mercury. Leo F. Epstein and Marion D. Powers. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 336-341.

Reliable data can be obtained using a Lennard-Jones 6-12 potential. Graphs. 33 ref. (P10, Hg)

139-P. Surface Tension at Elevated Temperatures. I. Furnace and Method for Use of the Sessile Drop Method; Surface Tension of Silicon, Iron, and Nickel. W. D. Kingery and M. Humenik, Jr. *Journal of Physical Chemistry,* v. 57, Mar. 1953, p. 359-363.

Includes graphs, tables, and diagrams. 12 ref. (P10, Fe, Ag, Ni)

140-P. The Exchange Energy of Nearly Free Electrons in Metals. E. P. Wohlfarth. *Philosophical Magazine,* v. 44, Mar. 1953, p. 281-288.

Exchange energy calculations of an assembly of nearly free electrons of low density. Graphs. 11 ref. (P10)

141-P. The Electrical Resistivity of Gold at Very Low Temperatures. A. J. Croft, E. A. Faulkner, J. Hatton, and E. F. W. Seymour. *Philosophical Magazine,* v. 44, Mar. 1953, p. 289-296.

Results for specimens in different states of physical strain down to 0.2° K and for one specimen down to 0.006° K. Diagrams and graphs. (P15, Au)

142-P. Properties of Thermally Treated Germanium. Leo Esaki. *Physical Review,* v. 89, Mar. 1, 1953, p. 1026-1034.

How properties of pure *n* type single crystalline Ge are affected by thermal treatment. Rectification characteristic, resistivity, and Hall coefficient of the specimen were measured. Graphs. 13 ref. (P15, Ge)

143-P. Microwave Observation of the Collision Frequency of Electrons in Germanium. T. S. Benedict and W. Shockley. *Physical Review,* v. 89, Mar. 1, 1953, p. 1152-1153.

Theory for calculation of effective mass and relaxation time. Graphs. (P10, Ge)

144-P. The Hall Coefficient of Calcium. V. Frank and O. Gram Jeppesen. *Physical Review,* v. 89, Mar. 1, 1953, p. 1153-1154.

Experiments and results of measurements. (P15, Ca)

145-P. Mixing of States and Antiferromagnetism. H. P. Hanson. *Physical Review,* v. 89, Mar. 1, 1953, p. 1154.

Discusses theory of superexchange. (P16, Mn)

146-P. The Thermal Conductivity of Superconducting Tin Below 1° K. B. B. Goodman. *Proceedings of the Physical Society,* v. 66, sec. A, Mar. 1953, p. 217-227.

Describes measurements made on specimens of widely differing purities and compares results. Graphs. 14 ref. (P11, Sn)

147-P. Photoelectric Absorption in Lithium Vapour. J. Tunstead. *Proceedings of the Physical Society,* v. 66, sec. A, Mar. 1953, p. 304.

Tests made of the continuous absorption of light in Li vapor. (P17, Li)

148-P. The Formation of Hydrogen Peroxide on Fresh Metal Surfaces. L. Grunberg. *Proceedings of the Physical Society,* v. 66, sec. B, Mar. 1953, p. 153-161.

The Russell effect, mechanical activation, and Kramer effect on reactivity of freshly formed metal surfaces. 14 ref. (P13, Zn, Al, Mg, Ni)

149-P. Long Wavelength Infrared Photoconductivity of Silicon at Low Temperatures. B. V. Rollin and E. L. Simmons. *Proceedings of the Physical Society,* v. 66, sec. B, Mar. 1953, p. 162-168.

An effect which is believed to be due to excitation of electrons or holes from impurity states. 16 ref. (P17, Si)

150-P. The Saturation Magnetization of Nickel at High Pressure. G. O. Jones and F. D. Stacey. *Proceedings of the Physical Society,* v. 66, sec. B, Mar. 1953, p. 255-256.

Generation of the highest pressures in thin specimens in order to measure magnetic properties under high pressures in high fields. (P16, Ni)

151-P. (English.) **The Solubility of Oxygen in Gamma Iron.** J. A. Kitchener, J. O'M. Bockris, Molly Gleiser, and J. W. Evans. *Acta Metallurgica,* v. 1, Jan. 1953, p. 93-101.

Measurements were made of O_2 uptake from a controlled CO-CO_2 gas mixture by thin strips of high-purity Fe foil heated at 1325-1423° C by means of an electric current. Tables. 18 ref. (P13, Fe)

152-P. (French.) **Study of the Surface Tension of a Grain-Boundary in a Metal as a Function of the Orientation of the Two Grains Which the Boundary Separates.** J. Friedel, B. D. Cullity, and C. Crussard. *Acta Metallurgica,* v. 1, Jan. 1953, p. 79-92.

Interfacial tension between two grains of an Al disk was measured in relative values by classical method of 3-way corner. Suggests new method of calculating interfacial energy. Calculations were carried out for Al, Cu, and α and γ-Fe. Tables and diagrams. 37 ref. (P10, Al, Cu, Fe)

153-P. (French.) **Gamma Radiation of the $Sn^{113}In^{113}$ Transition.** Yvon Deschamps and Paul Avignon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, Feb. 2, 1953, p. 478-480.

Experimental data. (P13, Sn, In)

154-P. (German.) **Theoretical Observations on the Influence of Ferromagnetic Coercive Force by Inclusions of Elliptical Rotational Form in Event That Their Dimensions Are Small as Compared With the Thickness of Block Walls (the Transitional Areas**

Between Weiss Areas). Everhard Schwabe. *Annalen der Physik,* v. 11, no. 2-3, 1952, p. 99-112.
(P16)

155-P. (German.) On the Structure of the Ferromagnetic State in α Iron and Certain Iron Alloys. Gerhard Heber. *Annalen der Physik,* v. 11, no. 2-3, 1952, p. 155-160.
Weaknesses of the Zener theory of magnetization saturation are pointed out. Possible kinds of exchange forces causing the ferromagnetism of the substance. 17 ref. (P16, Fe)

156-P. Thermal Neutron Capture Cross-Section of Na^{23} and Mn^{55}. Rosalie M. Bartholomew, R. C. Hawkings, W. F. Merritt, and L. Yaffe. *Canadian Journal of Chemistry,* v. 31, Mar. 1953, p. 204-206.
Activation method was used. Tables. 8 ref. (P10, Na, Mn)

157-P. Cathodic Lead Disintegration and Hydride Formation. Hugh W. Salzberg. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 146-151.
Rates of disintegration were studied in solutions of varying pH and salt concentration at different temperatures and current densities. Graphs. (P15, Pb)

158-P. Effect of Local Action Currents on the EMF of the Weston Standard Cell. Herbert H. Uhlig. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 173-177.
Factors causing drift which decrease observed emf., and ways to construct cells of maximum stability. 17 ref. (P15)

159-P. The Capacity of Polarized Platinum Electrodes in Hydrochloric Acid. W. D. Robertson. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 194-201.
Electrode capacity of Pt electrodes was measured in HCl by an impedance bridge. Capacity was determined as a function of polarizing voltage, concentration, and frequency. Diagrams and graphs. 17 ref. (P15, Pt)

160-P. Temperature Gradients in Inductively Heated Cylinders. R. J. Thorn and O. C. Simpson. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 297-299.
Method for calculating gradients. (P11, J2)

161-P. Minimum Physical Properties for RWMA Alloys. *Welding Engineer,* v. 38, Apr. 1953, p. 67.
Data sheet for Cu-base and Cu-W alloys. (P general, Q general, K3, Cu)

162-P. (English.) A New Method for Determining the Heat of Activation for Relaxation Processes. C. Wert and J. Marx. *Acta Metallurgica,* v. 1, Mar. 1953, p. 113-115.
Shows a straight-line relationship between the heat of activation of a relaxation process and the temperature at which maximum relaxation occurs. Graphs. (P12)

163-P. (English.) The Energy Stored During the Cold Working of a Gold-Silver Alloy. M. B. Bever and L. B. Ticknor. *Acta Metallurgica,* v. 1, Mar. 1953, p. 116-122.
Stored energy was determined calorimetrically as the difference in the small heat effects associated with bringing cold worked and annealed samples of the alloy from 0° C. into solution in liquid tin at 240° C. Graphs and tables. 33 ref. (P12, Au, Ag)

164-P. (English.) Activation Energies and Diffusion Coefficients of Oxygen and Nitrogen in Niobium and Tantalum. C. Y. Ang. *Acta Metallurgica,* v. 1, Mar. 1953, p. 123-125.
Theoretical diffusion coefficient curves were obtained from the relationship between heats of activation and the calculated diffusion coefficient constants. Graphs. (P12, N1, Cb, Ta)

165-P. (English.) Thermodynamics of Ordering Alloys. I. Activities in Cobalt-Platinum Alloys and Some General Considerations on Ordering Systems. R. A. Oriani. *Acta Metallurgica,* v. 1. Mar. 1953, p. 144-152.
In general the distortional, or strain, energy cannot be evaluated from a comparison of the heats of solution of corresponding solid and liquid solutions. Graphs and tables. 41 ref. (P12, N10, Co, Pt)

166-P. (English.) Thermoelectricity in Metals at Low Temperatures. D. K. C. MacDonald and W. B. Pearson. *Acta Metallurgica,* v. 1, Mar. 1953, p. 242-243.
Experimental study of thermoelectricity on the alkali metals and Cu, Ag, and Au over a wide temperature range. (P15, Cu, Ag, Au)

167-P. (German.) Structure and Heat of Formation of Alloys. U. Dehlinger. *Die Umschau in Wissenschaft und Technik,* v. 53, Feb. 1, 1953, p. 75-76.
Classifies alloys into four structural groups and distinguishes these by linear or parabolic shape of their heats of formation curves. Tables. (P12, M27)

168-P. (Book.) Heat Transfer Phenomena. The Flow of Heat in Physi-

cal Systems. R. C. L. Bosworth. 211 pages. 1952. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Reviews recent developments in heat transfer and is concerned with conduction of heat in gases; radiative transfer; conduction in solids and liquids; forced and natural convection; heat flow with simultaneous phase change; and use of electrical and other model methods. (P11)

169-P. (Book—Russian.) **Physical Chemistry of Pyrometallurgical Processes. v. I. Reactions Between Gaseous and Solid Phases.** O. A. Esin and P. V. Geld. 510 pages. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Divided into sections dealing with fundamentals, thermodynamics, and molecular physics. (P12)

170-P. Magnesium Alloy Characteristics. *American Foundryman,* v. 23, Apr. 1953, p. 156-158.

Tabulated information on mechanical and physical properties; composition; and characteristics of Mg casting alloys.
(P general, Q general, Mg)

171-P. Spin Waves in Ferromagnetic and Antiferromagnetic Materials. F. Keffer, H. Kaplan, and Y. Yafet. *American Journal of Physics,* v. 21, Apr. 1953, p. 250-257.

Brief outline of the spin-wave approximation to the near ground states of ferromagnetism and antiferromagnetism. Simple pictorial models of spin waves are introduced. Proper normal modes for antiferromagnetic spin waves are presented. Diagrams. 19 ref. (P16, SG-n, p)

172-P. Behavior of Magnetic Materials. R. M. Bozorth. *American Journal of Physics,* v. 21, Apr. 1953, p. 260-266.

Review of recent work in which atomic theory of ferromagnetism and domain theory of magnetization are applied to ferrites and fine particle magnets. Diagrams.
(P16, SG-n, p)

173-P. Measurement of the Half-Lives of AcC^{11}, Cu^{66}, Mg^{27}, Ti^{51}, Tl^{206}, and V^{53}. B. W. Sargent, L. Yaffe, and A. P. Gray. *Canadian Journal of Physics,* v. 31, Feb. 1953, p. 235-249.

Radionuclides were produced by irradiating pure metals or oxides with neutrons in the NRX reactor. β-activities were measured by rate of deflection of a quartz fiber in an electroscope. Half-lives were determined by the method of least squares. Tables and graphs. 40 ref. (P13, Cu, Mg, Ti, Tl, V)

174-P. Cross Section for the Reaction $Be^9(\gamma, p)Li^8$. R. N. H. Haslam, L. Katz, E. H. Crosby, R. G. Summers-Gill, and A. G. W. Cameron. *Canadian Journal of Physics,* v. 31, Feb. 1953, p. 210-217.

Investigation in which the cross section for the reaction was determined for photon energies between the threshold and maximum energy available, 26 Mev. Graphs. 16 ref. (P13, Be)

175-P. The Photoneutron Cross Sections of Rb^{87}, Zr^{90}, and Mo^{92}. L. Katz, R. G. Baker, and R. Montalbetti. *Canadian Journal of Physics,* v. 31, Feb. 1953, p. 250-261.

Mathematical analysis, procedure and results. Graphs and tables. 23 ref. (P13, Rb, Zr, Mo)

176-P. The Initial Magnetization of Nickel Under Tension. B. N. Brockhouse. *Canadian Journal of Physics,* v. 31, Mar. 1953, p. 339-355.

Initial susceptibility and Rayleigh constant of pure Ni wire were measured between room temperature and the Curie point under various tensions. Graphs. 17 ref. (P16, Ni)

177-P. Fission Yields of the Stable and Long-Lived Isotopes of Cesium, Rubidium, and Strontium and Nuclear Shell Structure. D. R. Wiles, B. W. Smith, R. Horsley, and H. G. Thode. *Canadian Journal of Physics,* v. 31, Mar. 1953, p. 419-431.

Determination by the mass spectrometer. 17 ref. (P13, Ce, Rb, Sr)

178-P. Resonant Scattering of Slow Neutrons. B. N. Brockhouse. *Canadian Journal of Physics,* v. 31, Mar. 1953, p. 432-452.

Method for measuring as a function of neutron energy, the scattering cross section for slow neutrons of materials having high absorption. Measurements are presented for the low energy neutron resonances in Cd, Sm, Gd, Dy, Eu, Rh, and In. Graphs. 33 ref. (P13)

179-P. Magnetic Materials. G. H. Stearley. *Materials & Methods,* v. 37, Apr. 1953, p. 115-130.

Compositions, properties, characteristics, and applications of nonretentive, permanent, and special-property magnetic and nonmagnetic materials. Diagrams, tables, and photographs. 19 ref. (P16, SG-n)

180-P. Properties and Heat Treatment of Diffusion Hardening Permanent Magnet Alloys. *Materials & Methods,* v. 37, Apr. 1953, p. 135.

Tabulated information.
(P16, Q general, J general, SG-n)

181-P. Properties and Heat Treatment of Magnet Steels. *Materials & Methods,* v. 37, Apr. 1953, p. 137.

Tabulated information.
(P16, Q general, J general, AY, SG-n)

182-P. The Approach to Saturation in Dilute Ferromagnetics. Alan D. Franklin and Ami E. Berkowitz. *Physical Review,* v. 89, Mar. 15, 1953, p. 1171.

Study of the law of approach to magnetic saturation in finely divided and diluted iron powders.
(P16, H11, Fe)

183-P. Total Fast Neutron Cross Sections of Co, Ga, Se, Cd, Te, Pt, Au, Hg, and Th. M. Walt, R. L. Becker, A. Okazaki, and R. E. Fields. *Physical Review,* v. 89, Mar. 15, 1953, p. 1271-1272.

Cross sections were measured as a function of neutron energy from 0.1 to 3 Mev. Results give additional evidence that, neglecting resonance structure, total neutron cross-section curves have characteristic shapes which change slowly with atomic weight. Graphs. (P13)

184-P. The Absolute Determination of Resonant Energies for the Radiative Capture of Protons by Boron, Carbon, Fluorine, Magnesium, and Aluminum in the Energy Range Below 500 kev. S. E. Hunt and W. M. Jones. *Physical Review,* v. 89, Mar. 15, 1953, p. 1283-1287.

Experiments, targets, detection, and results. Graphs. 11 ref.
(P13, Mg, Al)

185-P. The Temperature Dependence of Drift Mobility in Germanium. R. Lawrance. *Physical Review,* v. 89, Mar. 15, 1953, p. 1295.

Method used to measure drift mobility of holes in 0.02-ohm per meter resistivity single crystal *n*-type Ge from 100 to 360° K. (P15, Ge)

186-P. Ferromagnetism. S. B. Batdorf. *Physics Today,* v. 6, Apr. 1953, p. 12-17.

Work performed to determine behavior of ferromagnetic materials. Diagrams and graphs.
(P16, SG-n, p)

187-P. Heat Effects in the Magnetization of Silicon Iron. L. F. Bates and G. Marshall. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 17-33; disc., p. 33.

Description of method which permits measurement of thermal changes which accompany step-by-step magnetization of ferromagnetic metals. Results are examined in the light of current domain theory and a theoretical procedure developed by Stoner and Rhodes. The thermal contribution resulting from change in intrinsic magnetization is subtracted from the recorded thermal change, and the residue is considered in detail. Graphs. 18 ref.
(P16, Fe)

188-P. The Analysis of Magnetization Curves. Edmund C. Stoner. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 2-16.

Concerned with general problem of magnetization curves for obtaining more complete and definite information. Brief account of current experimental work. Graphs and tables. 16 ref. (P16)

189-P. Spontaneous Magnetization. Techniques and Measurements. W. Sucksmith, C. A. Clark, D. J. Oliver, and J. E. Thompson. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 34-41; disc., p. 41.

Magnetic measurements for a Cu-Ni alloy and a mixed ferrite. Two methods employed for determination are justified from the lowest temperature to within neighborhood of the Curie point. Tables and graphs. 12 ref. (P16, Cu, Ni)

190-P. The Permalloy Problem. R. M. Bozorth. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 42-48.

Determination of crystal anisotropy and saturation magnetostriction in various crystal directions. Graphs. 18 ref. (P16, Ni)

191-P. Uniaxial Anisotropy of a Permalloy Crystal. Seiji Kaya. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 49-53; disc., p. 53-55.

Effective temperature range for magnetic field cooling, annealing at the critical temperature, change of magnetic characteristics with time of annealing, torque curves, possible origin of uniaxial anisotropy, and deduction of constricted hysteresis loop from uniaxial anistropy. Diagrams. (P16, Ni)

192-P. An Experimental Study of Barkhausen Noise in Nickel-Iron Alloys. D. I. Gordon. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 56-57.
(P16, Ni)

193-P. Atomic Moments in Alloys. J. E. Goldman. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 108-113; disc., p. 113.

Saturation moment of ferromagnetic alloys is considered in view of

the collective electron theory. Perturbations in band shape due to the fluctuating lattice potential are considered. Influence of order is treated on the basis of Slater's theory of the relation between long-range order and energy bands. Results of measurements of electronic specific heat and Hall effect are presented. Fe alloys, Cu-rich Ni-Cu alloys, and Ni_3Mn were used. Graphs and diagrams. 24 ref. (P16, Fe, Cu, Ni)

194-P. Magnetic Moment Orientation and Thermal Expansion of Antiferromagnetic CrSb. A. I. Snow. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 127.

Briefly describes investigation by neutron and X-ray diffraction techniques. (P16, Cr, Sb)

195-P. The High Temperature Magnetic Susceptibility of V, Nb, Ta, W, and Mo. C. J. Kriessman. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 122-126.

Temperature range of magnetic susceptibility measurements was extended from 1450 to 1850° C. A periodicity in the sign of the temperature coefficient of the magnetic susceptibility of the transition elements is discussed in relation to various theories of metals. Graphs and tables. 23 ref. (P16, V, Nb, Ta, W, Mo)

196-P. Some Magnetic and Electrical Properties of Gadolinium, Dysprosium, and Erbium Metals. S. Legvold, F. H. Spedding, F. Barson, and J. F. Elliott. *Reviews of Moder . Physics,* v. 25, Jan. 1953, p. 129-130.

Describes determination. Graphs. (P15, P16, Gd, Dy, Er)

197-P. Rotational Relaxation in Nickel at High Frequencies. W. P. Mason. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 136-139.

Measurements of the ΔE effect and the decrement are compared with that expected from a calculation of domain wall relaxations for a distribution of domain sizes as determined by the optical measurements. Graphs. (P16, Ni)

198-P. Ultrasonic Attenuation in Magnetic Single Crystals. Sheldon Levy and Rohn Truell. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 140-145.

Describes experiments using Ni crystals. Graphs and diagrams. 9 ref. (P16, Ni)

199-P. Domain Pattern in Silicon-Iron Under Stress. L. J. Dijkstra and U. M. Martius. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 146-150.

Investigations into the detailed changes in domain structure of ferromagnetic material under externally applied stress. Micrographs. (P16, Fe)

200-P. Hall Effect in Ferromagnetic Materials. Emerson M. Pugh and Norman Rostoker. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 151-157.

Experimental results are reviewed for Fe, Co, and Ni; and Co-Ni and Ni-Cu alloys. Graphs and diagrams. 29 ref. (P16, Fe, Co, Ni, Cu)

201-P. Helmholtz Coils for Production of Powerful and Uniform Fields and Gradients. S. T. Lin and A. R. Kaufmann. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 182-190.

Describes the solenoid which was designed for precise magnetic susceptibility determinations on metals and alloys over wide temperature range. Diagrams, graphs, and tables. (P16)

202-P. The Theoretical and Experimental Status of the Collective Electron Theory of Ferromagnetism. E. P. Wohlfarth. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 211-219.

Quantum-mechanical and statistical-mechanical foundations of the collective electron theory. Graphs. 61 ref. (P16)

203-P. Microwave Resonance Absorption in Gadolinium Metal. Arthur F. Kip. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 229-231; disc., p. 232.

Measurements at 9000 and 24,000 mc. per sec. Graphs. 11 ref. (P10, Gd)

204-P. Experimental Study of the Coercive Force of Fine Particles. W. H. Meiklejohn. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 302-306.

Experiments described test the theory of fine-particle magnets. Particles of Fe, Co, and Ni, of size 100 to 2000Å, were prepared by electrodeposition into a Hg cathode. Their sizes and shapes were determined with an electron microscope. Micrographs and graphs. 10 ref. (P16, Fe, Co, Ni)

205-P. A New Permanent Magnet From Powdered Manganese Bismuthide. Edmond Adams. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 306-307; disc., p. 308-309.

Development by powder-metallurgy techniques. (P16, H general, Mn)

206-P. Thin Films of Ferromagnetic Materials. E. C. Crittenden, Jr. and R. W. Hoffman. *Reviews of*

Modern Physics, v. 25, Jan. 1953, p. 310-315; disc., p. 315.

Experimental observations on magnetic properties of thin evaporated films of Ni. Graphs. (P16, Ni)

207-P. Coercive Force of Precipitation Alloys. A. H. Geisler. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 316-322.

Shows that Cunico, Cunife, and various types of Alnico are structurally analogous, in that at the state of high coercive force the crystal structure of the precipitate is distorted from a cubic lattice to a tetragonal lattice. Single empirical relation was derived from data for these materials in which maximum coercive force is directly related to degree of tetragonality and saturation induction of the precipitate. Diagrams. (P16, N7, Ni, Cu)

208-P. The Physical and Magnetic Structure of the Mishima Alloys. E. A. Nesbitt and R. D. Heidenreich. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 322-323.

Investigation for cause of magnetic properties in Mishima alloys. (P16, Fe, Ni, Al)

209-P. The Texture of Fine Ferromagnetic Powders. L. Weil. *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 324-326.

Determination of coercive force. Diagrams. 15 ref. (P16, SG-n)

210-P. (English.) **Some Measurements on the Absorption of 75-200 keV Electrons in Aluminum.** Ingvar Carlvik. *Arkiv För Fysik,* v. 6, no. 1, 1953, p. 1-16.

Measurements using mica-window G. M. counters as detectors. Results are compared with existing range-energy relations. Diagrams and graphs. (P13, Al)

211-P. (English.) **Directional Correlation Measurements on Successive Nuclear Gamma Rays in Hf^{177}.** T. Wiedling. *Arkiv För Fysik,* v. 6, no. 1, 1953, p. 39-48.

Previous work, apparatus and procedure, and results. Graphs. 38 ref. (P13, Hf)

212-P. (English.) **Studies of the Resonance Absorption of Neutrons in Uranium With the Time-of-Flight Method.** E. Hellstrand and R. Persson. *Arkiv För Fysik,* v. 6, no. 1, 1953, p. 57-68.

Theoretical considerations, apparatus and procedure, and results. Graphs and diagrams. 15 ref. (P10, U)

213-P. (English.) **The Distintegration of Zr^{95} and Nb^{95}.** Hilding Slätis and Luisa Zappa. *Arkiv För Fysik,* v. 6, no. 1, 1953, p. 81-93.

Describes various techniques and sources for obtaining disintegration. Graphs. 41 ref. (P13, Zr, Nb)

214-P. (German.) **Properties of Anodically Generated Oxide Layers of Aluminum and Aluminum Alloys.** F. Solar. *Mitteilungen des Chemischen Forschungsinstitutes der Wirtschaft Osterreichs,* v. 7, Feb. 1953, p. 6-12.

Water vapor swelling, hardness, heat resistance, and emission properties. Graphs. (P15, Al)

215-P. (German.) **Antiferromagnetism.** Heinrich Labhart, *Zeitschrift für angewandte Mathematik und Physik,* v. 4, Jan. 1953, p. 1-24.

Discusses exchange effect of simple magnets; Curie temperature and position; magnetic properties; and transition from paramagnetic to antiferromagnetic state. Graphs. 88 ref. (P16, Fe)

216-P. (German.) **Solubility and Ionizability of Foreign Substances in Germanium Monocrystals.** W. Dürr, J. Jaumann, and K. Seiler. *Zeitschrift für Naturforschung,* v. 8a, Jan. 1953, p. 39-46.

Selective crystallization was used to separate impurities. Data are charted and tabulated. (P13, Ge)

217-P. (Italian.) **Correlation Existing Between Magnetic Properties and the Structure of Steels. Application to a Non-Destructive Control Method.** G. H. Dion. *La Metallurgia Italiana,* v. 45, Jan. 1953, p. 1-12.

Magnetic stage development on atomic, simple crystal, and macroscopic scales. (P16, S13, ST)

218-P. The Vapor Pressure of Copper. Herbert N. Hersh. *American Chemical Society, Journal,* v. 75, Apr. 5, 1953, p. 1529-1531.

Vapor pressure was determined by the Knudsen effusion method between 1240 and 1560° K. Apparatus and results. Tables. 12 ref. (P12, Cu)

219-P. A Thermodynamic Study of the Zinc-Indium System. W. J. Svirbely and Sidney M. Selis. *American Chemical Society, Journal,* v. 75 Apr. 5, 1953, p. 1532-1535.

Electromotive force measurements of galvanic cells were made from 700 to 790° K. and 635 to 690° K. Integral heats of mixing and relative partial molar free energies; heat contents; entropies for liquid alloys; and activities of Zn and In were calculated at 700° K. Liquidus curve on Zn side of eutectic was

determined. Graphs and tables. 14 ref. (P12, M24, Zn, In)

220-P. An Apparatus for Measuring the Coefficient of Thermal Conductivity of Solids and Liquids. T. A. Marshall. *British Journal of Applied Physics,* v. 4, Apr. 1953, p. 112-114.

A flat plate type of apparatus. Values are given for coefficients of several typical dielectric cable materials over their working temperature range. Diagrams. 9 ref. (P11)

221-P. Determination of the Neutron Capture Cross Section for the Co^{59} (n,γ) Co^{60m} Reaction. N. Moss and L. Yaffe. *Canadian Journal of Chemistry,* v. 31, Apr. 1953, p. 391-395.

Procedures and results. 9 ref. (P13, Co)

222-P. Spreading of Liquid Metals on Solid Surfaces. A. Bondi. *Chemical Reviews,* v. 52, Apr. 1953, p. 417-458.

Properties which determine mutual wettability. Includes surface free energy of liquid and solid metals, metal oxides, and metal salts; interfacial free energy between them; and solubility and diffusion phenomena which affect the latter. Tables and graphs. 70 ref. (P10)

223-P. Electrical Phenomena in Adhesion. Part I. Electron Atmospheres in Dielectrics. Selby M. Skinner, Robert L. Savage, and John E. Rutzler, Jr. *Journal of Applied Physics,* v. 24, Apr. 1953, p. 438-450.

Phenomena of metal-polymer-metal adhesion. Origin of charges, how charge distribution can be related to experimental parameters, and what relation the charges have to adhesion. Diagrams. 32 ref. (P15)

224-P. Work Functions of Gas-Coated Tungsten and Silver Surfaces. G. L. Weissler and T. N. Wilson. *Journal of Applied Physics,* v. 24, Apr. 1953, p. 472-475.

Average electronic work functions of W and Ag surfaces, subjected to glow discharges in various gases (He, A, H_2, N_2, O_2, freon-12) and to water vapor, were determined by Oatley's magnetron contact potential method. History and treatment of the surfaces. Data presented were found to be reproducible. (P15, W, Ag)

225-P. Permanent Magnet Properties of Cobalt-Platinum Alloys. D. L. Martin and A. H. Geisler. *Journal of Applied Physics,* v. 24, Apr. 1953, p. 498.

Brief description. (P16, Co, Pt)

226-P. Bombardment of Ordered Cu_3Au by 1 MeV Electrons. C. E. Dixon, C. J. Meechan, and J. A. Brinkman. *Philosophical Magazine,* v. 44, Apr. 1953, p. 449-450.

Brief description of effects. (P15, Cu, Au)

227-P. Radiative Widths of Dipole Transitions in Light Elements. D. H. Wilkinson. *Philosophical Magazine,* v. 44, Apr. 1953, p. 450-452.

Tabulates available data. 35 ref. (P13)

228-P. Radiations of Pu^{243}. D. W. Engelkemeir, P. R. Fields and J. R. Huizenga. *Physical Review,* v. 90, Apr. 1, 1953, p. 6-10.

Radiations were studied with β- and γ-scintillation spectrometers alone and in coincidence. Incomplete disintegration scheme is deduced which leads to a total β-disintegration energy of 560 kev. Graphs. 11 ref. (P13)

229-P. Magnetic Structure Transitions. J. Samuel Smart. *Physical Review,* v. 90, Apr. 1, 1953, p. 55-58.

Problem of magnetic phase transitions between ferromagnetism and antiferromagnetism, or between two different kinds of antiferromagnetic arrangement. Such transitions may occur if the molecular field coefficients vary with temperature. 10 ref. (P16)

230-P. The Thermal Neutron Capture Cross Sections of Pa^{231} and Pa^{232}. R. Elson, P. A. Sellers, and E. R. John. *Physical Review,* v. 90, Apr. 1, 1953, p. 102.

Process for determining cross section. (P13, Pa)

231-P. Ultrasonic Attenuation Measurements in Germanium. Rohn Truell and Joseph Bronzo. *Physical Review,* v. 90, Apr. 1, 1953, p. 152.

Attenuation in solid materials was studied as a function of ultrasonic frequency and as a function of state or condition of the material. Differences in the state of a semiconductor can be examined by these measurements. (P15, Ge)

232-P. Temporary Traps in Silicon and Germanium. J. R. Haynes and J. A. Hornbeck. *Physical Review,* v. 90, Apr. 1, 1953, p. 152-153.

Evidence obtained from drift velocity measurements indicates the existence of trapping centers other than recombination centers for minority carriers in Ge and Si. (P15, Ge, Si)

233-P. The Magnetoresistance Effect in InSb. G. L. Pearson and M.

Tanenbaum. *Physical Review,* v. 90, Apr. 1, 1953, p. 153.

Preparation of compound in a highly purified form and results of magnetoresistance measurements which verify the high electron mobility. 7 ref. (P16)

234-P. Activity Assignment to Titanium 51. William R. Hammond, D. N. Kundu, and M. L. Pool. *Physical Review,* v. 90, Apr. 1, 1953, p. 157.

Procedure for confirming 6-min. activity. 8 ref. (P13, Ti)

235-P. Radioactive Decay of Y^{91}. F. I. Boley and D. S. Dunavan. *Physical Review,* v. 90, Apr. 1, 1953, p. 158.

Decay was investigated using scintillation counters. Results indicate that decay is by negatron emission only and is unaccompanied by γ-rays. (P13, Y)

236-P. Evidence for a 25.5-Day Sr —76-Sec Rb Chain. Paul Kruger and Nathan Sugarman. *Physical Review,* v. 90, Apr. 1, 1953, p. 158-159.

Research on isotopes of Sr and Rb. (P13, Sr, Rb)

237-P. The Angular Correlation of the Cascade Gamma-Rays From the Decay of Au^{198}. Carlton D. Schrader, Edward B. Nelson, and James A. Jacobs. *Physical Review,* v. 90, Apr. 1, 1953, p. 159.

Correlation determines spin and parity of the 1.09-Mev level as 2+ and the 0.68-Mev radiation was found to be a 60% quadrupole, 40% dipole mixture. 6 ref. (P13, Au)

238-P. Ionic Current and Film Growth of Thin Oxide Layers on Aluminium. A. Charlesby. *Physical Society, Proceedings,* v. 66, sec. B, Apr. 1953, p. 317-329.

Part of a series of investigations into the electrical properties of thin insulating oxide layers formed electrolytically on Al. Limited to a study of ionic current and resultant film growth. Graphs. 16 ref. (P15, R2, Al)

239-P. Radiative Transitions in Germanium. J. B. Gunn. *Physical Society, Proceedings,* v. 66, sec. B, Apr. 1953, p. 330-331.

Briefly describes investigation. (P13, Ge)

240-P. Electronic Wave Functions. Part IX. Calculations for the Three Lowest States of the Beryllium Atom. S. F. Boys. *Royal Society, Proceedings,* v. 217, ser. A, Mar. 24, 1953, p. 136-150.

Investigation which resulted in more accurate wave functions. Tables. 11 ref. (P15, Be)

241-P. Dose Rates of Radiation From Thorium and From Enriched Uranium. T. E. Bortner and H. K. Richards. *U. S. Atomic Energy Commission,* AECD-3484, Apr. 9, 1951, 18 pages.

Measurements made with the extrapolation chamber. (P13, Th, U)

242-P. Grain-Oriented Iron-Silicon Alloys. G. H. Cole. *Electrical Engineering,* v. 72, May 1953, p. 411-416.

Ideals and procedures utilized in the development and production of grain-oriented Fe-Si alloys. Chemical analysis and some properties of these materials. Data show large magnetic advantage of using the material parallel to the direction in which the alloy is rolled and indicate why transformer core designs are influenced greatly by the development. Graphs and tables. 21 ref. (P16, Fe, Si)

243-P. Beta-Spectrum of Radium. E. J. Pniewski and M. Danysz. *Nature,* v. 171, Apr. 18, 1953, p. 694-695.

Work to determine the low-energy region. Graphs. (P13, Ra)

244-P. Gamma-Ray Resonances in the Alpha-Particle Bombardment of Beryllium and Boron. F. L. Talbott and N. P. Heydenburg. *Physical Review,* v. 90, Apr. 15, 1953, p. 186-187.

Be and B were bombarded with α particles from an electrostatic generator at energies up to 3.0 Mev. Gamma-radiation yield was observed with scintillation counters. Graphs. (P13, Be)

245-P. The Infrared Absorption Characteristics of Thermiated Germanium. D. H. Rank and D. C. Cronemeyer. *Physical Review,* v. 90, Apr. 15, 1953, p. 202-203.

Investigation of infrared transmission of thermiated Ge and examination of the effect of annealing upon the absorption spectrum of a thermiated sample. (P17, Ge)

246-P. Gamma-Rays From Mg^{25}. John E. May and Bruce P. Foster. *Physical Review,* v. 90, Apr. 15, 1953, p. 243-247.

Energies of the α-rays found in coincidence with the protons of the $Na^{23}(a,p)Mg^{26}$ reaction were measured with a NaI(TI) scintillation counter. Includes discussion of possible spin and parity assignments and a few decay schemes proposed by the use of the Weisskopf lifetime formulas. Graphs. (P13, Mg)

247-P. Radioactivity of Pt^{191} and Pt^{193m}. J. B. Swan, W. M. Portnoy, and R. D. Hill. *Physical Review,* v. 90, Apr. 15, 1953, p. 257-258.

A 3.2-day activity of Pt^{191} and a 4.5-day activity of Pt^{193} were investigated. (P13, Pt)

248-P. Recombination Rate in Germanium by Observation of Pulsed Reverse Characteristic. E. M. Pell. *Physical Review,* v. 90, Apr. 15, 1953, p. 278-279.

Method for measuring recombination rates of minority carriers in Ge is described in which decay of injected carriers is observed directly as a function of time. Data show excellent agreement between this method and a light beam method. (P15, Ge)

249-P. High Energy Gamma-Gamma Cross Section of In^{115}. J. Goldemberg and L. Katz. *Physical Review,* v. 90, Apr. 15, 1953, p. 308-314.

Several photonuclear reactions induced in In by X-rays from a 25-Mev betatron were measured. Ratio of cross sections for production of the isomric and ground states of In^{114} was studied. (P13, In)

250-P. Decay Scheme of $Magnesium^{29}$. R. K. Sheline and N. R. Johnson. *Physical Review,* v. 90, Apr. 15, 1953, p. 325.

To study its decay scheme, a disk of Mg metal of ordinary isotopic composition was bombarded in an external beam of 39-Mev α particles for 9.2 hr. in 60-in. cyclotron. (P13, Mn)

251-P. The β-Half-Life of Pu^{241}. D. R. MacKenzie, M. Lounsbury, and A. W. Boyd. *Physical Review,* v. 90, Apr. 15, 1953, p. 327-328.

Briefly describes determination. (P13, Pu)

252-P. The Beta-Spectrum of Mg^{28}. Luis Marquez. *Physical Review,* v. 90, Apr. 15, 1953, p. 330-331.

Briefly describes measurements. (P13, Mg)

253-P. Thermo-Electric Behaviour of Tin and Silver at Liquid-Helium Temperatures. G. T. Pullan. *Royal Society, Proceedings,* Ser. A, v. 217, Apr. 8, 1953, p. 280-293.

New method which employs a superconducting galvanometer and requires a temperature difference of only 0.01° K between ends of specimen to measure absolute thermoelectric powers of Sn and Ag. Graphs. 23 ref. (P15, Sn, Ag)

254-P. (German.) **Electrochemical Behavior of Indium Amalgams.** N. Sundén. *Zeitschrift für Elektrochemie; Berichte der Bunsengeselschaft für physikalische Chemie,* v. 57, no. 2, p. 100-102.

Relationship between an In electrode and in ions. Tables and graphs. (P15, In, Hg)

255-P. (Book.) **Physical Chemistry of Metals.** Lawrence S. Darken and Robert W. Curry. 535 pages. 1953. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $8.50.

First section is devoted to descriptions of solid and liquid states of alloys and metals from the chemist's viewpoint rather than the solid-state physicist. Second section deals with classical chemical thermodynamics and the third law. Included is an extensive treatment of pressure-temperature-composition relations in heterogeneous systems where several phases may be of variable composition. (P12)

256-P. (Book.) **Washington Conferency on Magnetism, Sept. 2-6, 1952. Sponsored by U. S. Office of Naval Research.** *Reviews of Modern Physics,* v. 25, Jan. 1953, p. 1-351.

Contains 66 papers and discussions presented at the conference held at University of Maryland. Many are separately abstracted. (P16)

257-P. Distribution of Conductivity Within Dielectric Films on Aluminum. J. E. Lilienfeld and Charles Miller. *Electrochemical Society, Journal,* v. 100, May 1953, p. 222-226.

Studies made to determine electrical performance of the condenser film on anodized Al. Data were obtained by drawing a correlation between the physical components of the condenser and the electrical components of a model circuit. (P15, Al)

258-P. Thermal Conductivity Data Presented for Various Metals and Alloys Up to 900° C. L. Silverman. *Journal of Metals,* v. 5, May 1953, p. 631-632.

Method for determining the data. Graphs and tables. (P11)

259-P. Effect of Dissolved Sulphur on the Surface Tension of Liquid Copper. C. F. Baes, Jr. and H. H. Kellogg. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 643-648.

Measurement by a sessile-drop method at 1120° C. Degree of adsorption of S on the liquid Cu surface was calculated and various models of the surface layer were tested against the results. Diagrams. (P12, Cu)

260-P. Free Energy of Vaporization of Metals from 0° to 2000° C. J. W. Evans. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 655-657.

Presents graphically the free energies of vaporization of a number of metals of economic importance which can be used in conjunction with other free-energy diagrams. (P12)

261-P. Vapor Pressure of Silver. C. Law McCabe and C. Ernest Birchenall. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 707-709.

Redetermination of vapor pressure under conditions permitting precise temperature measurement. Graphs. (P12, Ag)

262-P. Vapor Pressure of Silver Over Silver-Gold Solid Solutions. C. L. McCabe, H. M. Schadel, Jr., and C. E. Birchenall. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 709-711.

Describes measurements. Orifice effusion was compared with electromotive force measurement as a means for determining thermodynamic activities in these solid metallic alloys. Correlated activity coefficients are given for Ag-Au alloys from 200 to 1000° C. Graphs and table. (P12, Ag, Au)

263-P. Notes on Melting of Cadmium Scrap for Anodes. L. Apelt. *Metal Finishing,* v. 51, May 1953, p. 78. Translated and condensed.

Previously abstracted from *Metalloberflaeche.* See item 451-P, 1952. (P12, E10, Cd)

264-P. Half-Life of Pd and Neutron Activation Cross Section of Pd. W. Wayne Meinke. *Physical Review,* v. 90, May 1, 1953, p. 410-412.

Experimental determination. (P13, Pd)

265-P. The Zn^{64}(d, αn)Cu^{61} Reaction. C. Sharp Cook and Fred T. Porter. *Physical Review,* v. 90, May 1, 1953, p. 429.

Relative cross sections for the Zn^{64}(d, αn)Cu^{61} and Zn^{66}(d, α)Cu^{64} reactions were determined from β-ray data. (P10, Zn, Cu)

266-P. The Radioactive Decay of Cs^{134}, Os^{185}, Os^{191}, and Os^{193}. J. M. Cork, J. M. LeBlanc, W. H. Nester, D. W. Martin, and M. K. Brice. *Physical Review,* v. 90, May 1, 1953, p. 444-447.

Deals with each individually. (P13, Cs, Os)

267-P. Relative Abundances and Neutron Capture Cross Sections of the Neodymium Isotopes. W. H. Walker and H. G. Thode. *Physical Review,* v. 90, May 1, 1953, p. 447-448.

Double-focusing mass spectrometer was used to determine the relative isotopic abundances of naturally-occurring Nd and the relative isotopic neutron capture cross sections. Relative abundances are compared with the results previously published. (P10, Nd)

268-P. On the Interaction of 95-Mev Protons With D, Li, Be, C, Al, Cu, and Pb Nuclei. J. A. Hofmann and K. Strauch. *Physical Review,* v. 90, May 1, 1953, p. 449-460.

Describes measurement made of the energy distribution of neutrons emitted from various targets at angles of 0, 5, 10, 16, and 28° with respect to the primary 95-Mev proton beam. Diagrams, graphs, and tables. (P10, Be, Al, Cu, Pb)

269-P. The (α,n) and (α,2n) Cross Sections of Ag^{109}. E. Bleuler, A. K. Stebbins, and D. J. Tendam. *Physical Review,* v. 90, May 1, 1953, p. 460-463.

Excitation curves for the reactions were measured for α-energies up to 19.5 Mev. Graphs. (P10, Ag)

270-P. Isomerism of In^{110} and In^{112}. E. Bleuler, J. W. Blue, S. A. Chowdary, A. C. Johnson, and D. J. Tendam. *Physical Review,* v. 90, May 1, 1953, p. 464-468.

Decay was investigated by β-ray spectrometer and coincidence measurements. Graphs. (P13, In)

271-P. Reversal of Spontaneous Magnetization as a Function of Temperature in LiFeCr Spinels. E. W. Gorter and J. A. Schulkes. *Physical Review,* v. 90, May 1, 1953, p. 487-488.

Describes investigation of $Li_{0.5}{}^{+}Fe_{2.5-a}{}^{3+}Cr_a{}^{3+}O_4{}^{2-}$ between $a = 0$ and 2.0. (P16, Fe, Cr)

272-P. Anomalous Behavior of the *g* Factor of LiFeCr Spinels as a Function of Temperature. J. S. van Wieringen. *Physical Review,* v. 90, May 1, 1953, p. 488.

Measurement of ferromagnetic resonance absorption of polycrystalline samples. (P16, Fe, Cr)

273-P. Semiconducting Intermetallic Compounds. R. G. Breckenridge. *Physical Review,* v. 90, May 1, 1953, p. 488-489.

Considers InSb, GaSb, and AlSb. (P15, In, Sb, Ga, Al)

274-P. Synchrocyclotron Production and Properties of Magnesium 28. John W. Jones and Truman P. Kohman. *Physical Review,* v. 90, May 1, 1953, p. 495-496.

Describes determination of half-life for Mg^{28} and Al^{28}. (P13, Mg, Al)

275-P. Dysprosium 157. Thomas H. Handley and Elmer L. Olson. *Physical Review,* v. 90, May 1, 1953, p. 500-501.

Determination of 8.2 ± 0.1 hour activity. Graphs. (P13, Dy)

276-P. The Solubility of Indium in Mercury. William M. Spicer and Cyril J. Banick. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2268-2269.

Investigation of entire range of compositions by means of cooling curves. (P13, In, Hg)

277-P. Concerning the Low Temperature Specific Heat of Tellurium. Warren DeSorbo. *Journal of Chemical Physics,* v. 21, Apr. 1953, p. 764-765.

Results of the analysis of specific heat data. (P12, Te, Se)

278-P. Nuclear Power Plants. Design and Performance of Liquid-Metal Heat Exchangers and Steam Generators. R. D. Brooks and A. L. Rosenblatt. *Mechanical Engineering,* v. 75, May 1953, p. 363-368.

Testing of equipment described resulted in better understanding of design aspects for liquid-metal heat exchange equipment. Heat transfer coefficients for shell-side conditions were evaluated. Graphs. (P11, T5, Na, K)

279-P. Semiconducting Films. W. M. Becker and K. Lark-Horovitz. *National Electronics Conference, Proceedings,* v. 8, 1952, p. 506-509.

Ge thin films were deposited on quartz by thermal dissociation of GeH_4. Hall constant and resistivity of the films were measured as a function of temperature. Graphs. 10 ref. (P15, Ge)

280-P. Properties of Beryllium. Murray C. Udy, Homer L. Shaw, and Francis W. Boulger. *Nucleonics,* v. 11, May 1953, p. 52-59.

Survey of atomic, nuclear, physical, chemical, and mechanical properties of Be. Graphs, tables. 21 ref. (P general, Q general, Be)

281-P. Some Properties of Silicon Point-Contact Transistors. J. W. Granville and W. Bardsley. *Physical Society, Proceedings,* v. 66, sec. B, May 1953, p. 429.

Brief description. (P15, Si)

282-P. The Average Number of Neutrons Emitted in the Spontaneous Fission of 242_{cm}. F. R. Barclay and W. J. Whitehouse. *Physical Society, Proceedings,* v. 66, sec. A, May 1953, p. 447-453.

Average number of neutrons emitted in spontaneous fission of Cm^{242} was measured by a method depending on the device of counting only those neutrons which are detected after the occurrence of a fission. Diagrams. (P13, Cm)

283-P. (French.) **Action of Zinc on Certain Unsaturated Bromides.** Clement Troyanowsky. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 6, Feb. 9, 1953, p. 618-619.

Action of Zn on an alcoholic solution of dibromo-1,4 butyn-2, forms 1,3 butadiene. The same product is obtained with tetrabromo-1,2,3,4, butane-2. (P13, Zn)

284-P. (French.) **Experimental Results of the Photomagneto-Electric Effect.** Pierre Aigrain and Hubert Bulliard. *Comptes Rendus hebdomadaires des Seances de l'Academie des Sciences,* v. 236, no. 7, Feb. 16, 1953, p. 672-674.

Results of measuring photomagneto-electric effect of Ge. (P15, Ge)

285-P. (French.) **Measuring the Reflection Powers of Thick Metallic Layers (Au, Pt, Cr) in the Schumann Region. Determination of Optical Constants.** Simone Robin. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 7, Feb. 16, 1953, p. 674-676.

Experimental results. Charts show curves representing reflector power at 18° and 45° angles of incidence for the three metals. (P17, Au, Pt, Cr)

286-P. (French.) **Some Characteristic Reactions of Metals in Connection With Typical Organic Structures.** Pierre Bevillard. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 7, Feb. 16, 1953, p. 711-714.

A brief outline of the interactions of the ortho-diphenol group and the substituted amine function in the triphenylmethane group. (P13)

287-P. (French.) **Establishment of Thermo-Electric Power for Very Small Temperature Differences.** Jean Savornin and France Savornin. *Comptes Rendus hebdomadaires des Séances de l'Academie des Sciences,* v. 236, no. 9, Mar. 2, 1953, p. 898-900.

Research on Si-type *p* semiconductor. (P15, Si)

288-P. (French.) **Electrical Conductivity of Different Samples of High Purity Aluminum at Low Temperature.** Michel Caron. *Comptes Rendus*

hebdomadaires des Séances de l'Académie des Sciences, v. 236, no. 11, Mar. 16, 1953, p. 1169-1171.
Graphs. 3 ref. (P15, Al)

289-P. (French.) **Nuclear Physics. Study of Zn^{65} Radiation.** Mitsuo Sakai and Pierre Hubert. *Comptes Rendus hebdomadaires des Seances de l'Académie des Sciences,* v. 236, no. 12, Mar. 23, 1953, p. 1249-1251.
Discusses γ radiation of Zn^{65}, its β^+ spectral conversion coefficient, and the relation $N\gamma/N\beta^+$ using a spectrometer with a magnetic prism. 6 ref. (P13, Zn)

290-P. (German.) **Studies on the Behavior of Ferrous Metals in Electrodes.** G. Kröncke and G. Masing. *Wersktoffe und Korrosion,* v. 4, no. 3, Mar. 1953, p. 86-95.
No differences in potential were found between hexagonal and cubical forms of Co. Polarization of Co resulted in formation of hysteresis loop. Work was also done on Ni and Fe. (P15, Co, Ni, Fe)

291-P. (German.) **Metallic Migration on Contacts Made of Super-Structured Alloys.** Albert Keil and Carl-Ludwig Meyer. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 22-26.
Presents a survey of forms of appearance and possible meanings of the effect of metallic migration on circuit-breakers. Tests on Pd-Cu and Au-Cu contacts showed almost no migration. (P15, Cu)

292-P. (French.) **Time Changes in Thermionic Thoria Cathodes.** G. Mesnard. *Vide, Le,* v. 8, no. 43, Jan. 1953, p. 1273-1279.
Behavior is due either to heat action or to electron current action. Though difficult, these two actions are separated and effects of current and cathode temperature are discussed. Tables, graphs. 7 ref. (P15)

293-P. (German.) **Change of Electrical Resistance by Cold Deformation.** Hermann Weyerer. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 51-58.
Minimum resistance, whose exact form depends on degree of purity and atmosphere of heating, was found for hard drawn wire and brass wires. This resistance was found to be related to the heating temperature of the metal.
(P15, Cu, Fe, Al)

294-P. (German.) **Field Electronic Emission and Work Function of Individual Crystalline Surfaces.** M. Drechsler and E. W. Müller. *Zeitschrift für Physik,* v. 134, no. 2, 1953, p. 208-221.
Formulas are derived for field emission current densities of individual surfaces and total current of metallic surfaces. Diagrams, graphs, tables. (P15)

295-P. The Two-Dimensional Magnetic or Electric Field Above and Below an Infinite Corrugated Sheet. N. H. Langton and N. Davy. *British Journal of Applied Physics* v. 4, May 1953, p. 134-137.
Field is investigated on the sheet which is regarded as a magnetized ferromagnetic body. Method involves use of conformal transformations and elliptic integrals. Tables, diagrams. (P16)

296-P. Chemistry in Iron & Steel Research. *Chemical Age,* v. 68, May 9, 1953, p. 695-700.
Reviews work with physical chemistry, refractories, and corrosion.
(P13, R general, Fe, ST, EG-d)

297-P. Measurements on Superconductivity in Thin Tin Films. A. Van Itterbeek, L. De Greve, L. Van Gerven, and J. Schepers. *Nature,* v. 171, May 9, 1953, p. 834.
Describes measurements under influence of a magnetic field and under combined action of the current and a magnetic field. (P15, Sn)

298-P. Kramer and Russell Effects With Single Crystals of Zinc. L. Grunberg and K. H. R. Wright. *Nature,* v. 171, May 16, 1953, p. 890.
Experiment which showed that abrasion of metals causes formation of sites of low work function.
(P15, M26, Zn)

299-P. Observations on Slip Found in a Diamond. S. Tolansky and M. Omar. *Philosophical Magazine,* v. 44, May 1953, p. 514-518.
Interferometric and optical studies on a twinned diamond reveal the presence of true crystallographic slip on two opposite faces of the twin. Internal optical opacity is found associated with the slip.
(P17, C)

300-P. On the Existence of Multiple Resonances in the Cu $(\gamma,n)^{62}$ Cu Reaction. K. Phillips. *Philosophical Magazine,* v. 44, May 1953, p. 533-541.
Accurate control of the energy of a 20 Mev betatron shows that the activation-energy curve consists of a series of small plateaus indicating the existence of narrow resonances for the photo-neutron reaction in Cu. 13 ref. (P13, M25, Cu)

301-P. (German.) **Electrical Behavior of Thin, Metallic Coatings.** A. Schulze and H. Eicke. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 171-182.

Presents studies of electrical resistance and temperature coefficients for layers of various metals. Differences in behavior are enumerated. Graphs, tables. 25 ref. (P15)

302-P. (German.) **Highly Permeable Alloys in the System NiFeCuMo.** F. Assmus and F. Pfeifer. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 189-191.

Study of a series of Cu-containing permalloy alloys from 300-600° C. Influence of tempering on magnetic properties. Graphs. 8 ref. (P16, Ni, EG-n)

303-P. (German.) **Development and Present State of Permanent Magnet Materials.** Walter Dannöhl. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 65-81.

Classification methods yielding permanent magnet properties. Permanent magnet materials used in Germany and abroad. Theory of coercive force; demagnetization curve; and ring and tip formation of the so-called "Weiss" zones. (P16, SG-n)

304-P. (German.) **Electrochemical Behavior of Fe-Cr Alloys in KNO_3 and Dilute HNO_3.** Th. Neumann and W. Rösener. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 17-22.

Alloys with up to 17% Cr remained in the solid state and evolved O_2 when placed in KNO_3 at a sufficiently high potential. Alloys of higher Cr content were dissolved without O_2 evolution. (P15, AY)

305-P. (German.) **Spectral-Analytical Research on PbS With Regard to Photo-Electric and Thermo- and Rectifier Effects.** J. E. Hiller and H. G. Smolczyk. *Zeitschrift für Elecktrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 50-58.

Fifty-seven PbS samples of varying origin and formation were tested. Relationships of these effects were compared with results of spectral and X-ray research. (P15)

306-P. (German.) **Catalytic Activity of Nickel and Cobalt and Its Dependence on Hydrogenation Temperature.** F. Lihl and P. Zemsch. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 1, 1953, p. 58-69.

Extent to which relationships can be described by Arrhenius equation. (P13, Ni, Co)

307-P. The Adsorption of Gases at High Saturations. I. The Adsorption of Nitrogen, Argon, and Oxygen. II. The Thickness of the Unsaturated Helium Film. Raymond Bowers. *Philosophical Magazine,* v. 44, May 1953, p. 467-496.

Adsorption of A, N_2, and O_2 on an Al foil determined by gravimetric method. Data obtained at high saturations compared with equation describing multilayer adsorption. Adsorption of He on an Al foil measured between 1.8° K and 4.2° K. Values for the unsaturated film compared with existing data for the thickness of the saturated helium II film. Graphs. 48 ref. (P13, S11, Al, EG-m,p)

308-P. (Book—German.) **(Magnetic Measurements of Ferromagnetic Materials.) Magnetische Messungenan Ferromagnetischen Stoffen.** Werner Jellinghaus. 163 pages. 1952. Walter de Gruyter & Co., Berlin. W. 35, Germany.

Includes systems of measurement, magnetic field generation, processes for determining points of hysteresis loop, magnetostriction, screening, and temperature influence. (P16)

309-P. (Book.) **Metallurgical Thermochemistry.** O. Kubaschewski and E. Ll. Evans. 368 p. 1951. Academic Press, 125 E. 23rd St., New York 10, N. Y. $6.00.

Theoretical basis, experimental methods, estimation of thermochemical data, tabulation of data, and examples of thermochemical treatment of metallurgical problems. (P12)

310-P. Vapor Pressures of Inorganic Substances. XI. Titanium Between 1587 and 1764° K., and Copper Between 1143 and 1292° K. James W. Edwards, Herrick L. Johnston, and Walter E. Ditmars. *American Chemical Society, Journal,* v. 75, May 20, 1953, p. 2467-2470.

Vapor pressures of Cu and Ti were determined using the Langmuir method of vacuum evaporation. Heats of sublimation at absolute zero were calculated; and equations for the vapor pressure, as functions of temperature, were formulated. Graphs, tables. (P12, Ti, Cu)

311-P. Ferromagnetism and Order in Nickel-Manganese Alloys. G. R. Piercy and E. R. Morgan. *Canadian Journal of Physics,* v. 31, May 1953, p. 529-536.

Investigation of ferromagnetism in Ni-Mn alloys containing up to 40 atomic % Mn. Alloys within this composition range were subjected to heat treatments such that the atomic arrangement within the alloys varied from disorder to a high

degree of long-range order. Degree of order of Ni_3Mn calculated from measured saturation magnetization using the atomic model of ferromagnetism was consistent with the value calculated from the ratio of measured integrated intensity of the (110) X-ray diffraction superlattice line to that of line (111). Graphs. 11 ref. (P16, N10, Ni)

312-P. Determining Properties of Bulk Semiconductors. R. B. McQuistan. *Electronics,* v. 26, June 1953, p. 150-155.

Resistance-temperature characteristics of bulk Ge and other semiconductors are determined oscillographically by pulse-heating method. Measurement from temperature of liquid H_2 to 650° K. takes less than a second. Diagrams. 8 ref. (P15, Ge, Au)

313-P. Adsorption by Evaporated Copper Films at 78° K. I. Krypton and Hydrogen. II. Krypton and Oxygen. G. L. Kington and J. M. Holmes. *Faraday Society, Transactions,* v. 49, Apr. 1953, p. 417-432.

Experimental data. Graphs. 34 ref. (P13, Cu)

314-P. The Development of Titanium Carbides. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 25, May 9, 1953, p. 81, 83-84.

Physical and mechanical properties. (P general, Q general, Ti, C-n)

315-P. Metal Physics Work of the Division of Tribophysics, C.S.I.R.O. W. Boas. *Nature,* v. 171, May 23, 1953, p. 908-910.

Work aimed at a better understanding of the properties and behavior of metals and alloys. (P general)

316-P. Determination of the Relative Electrode Potential of an Uncharged Metal in Solution. J. O'M. Brockris and R. Parry-Jones. *Nature,* v. 171, May 23, 1953, p. 930-931.

A method of determining the potential of a charge-free surface at a solid metal-solution interface. 9 ref. (P15, Zn, Pb, Cd, Cu, Ni)

317-P. Optical Properties of Bismuth in the Near Infrared. L. G. Schulz. *Optical Society of America, Journal,* v. 43, May 1953, p. 406-407.

Optical and electrical properties of metal films. (P17, P15, Bi)

318-P. The Transmission of Electrons Through Thin Metallic Foils. C. H. Chang, C. S. Cook, and H. Primakoff. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 544-547.

Experimental studies were made on the relative transmission of positrons and negatrons through Al and Pt windows of an end-window-type G-M counter. Theoretical transmission curves, with an empirically determined constant, were developed. Graphs. 13 ref. (P10, Al, Pt)

319-P. Photomesonic Fission of Bismuth. G. Bernardini, R. Reitz, and E. Segre. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 573-574.

Fission of Bi by high-energy photons was detected by a photographic plate technique. Some measurements on the cross section as a function of the photon energy are reported. 13 ref. (P13, Bi)

320-P. Radiochemical Studies on the Photofission of Thorium. Dale M. Hiller and Don S. Martin, Jr. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 581-585.

Report on the radiochemically determined yields of 13 nucleon (mass) numbers produced by the irradiation of Th with 69-Mev bremsstrahlung. Graphs. 20 ref. (P13, Th)

321-P. Nuclear Levels Associated With Zirconium 95 and Niobium 95. J. M. Cork, J. M. LeBlanc, D. W. Martin, W. H. Nester, and M. K. Brice. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 579-581.

A study was made of the β and γ-energies and of the half-lives associated with the radioactive decay. Tables. (P13, Zr, Cb)

322-P. Comparison of the Values of the Disintegration Constant of Be^7 in Be, BeO, and BeF_2. J. J. Kraushaar, Elizabeth D. Wilson, and Kenneth T. Bainbridge. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 610-614.

Difference in the decay constants were measured using the differential ionization chamber technique. Graphs, tables. 15 ref. (P13, Be)

323-P. The Total Neutron Cross Sections of Gold, Chlorine, and Phosphorus. S. C. Snowdon and W. D. Whitehead. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 615-618.

Total neutron cross sections were measured over the energy range 100 to 700 kev using the mono-energetic neutrons from the $H^3(p,n)He^3$ reaction with an energy resolution of about 40 kev. Graphs. 9 ref. (P10, Au)

324-P. Total Cross Sections of Chlorine, Sodium, Titanium, and Bromine for Fast Neutrons. H. R. Dvorak and R. N. Little, Jr. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 618-622.

Relatively new liquid scintillation counter methods were adapted to detect fast neutrons with a heretofore unattainable efficiency of about 19%. Graphs. 21 ref. (P10, Na, Ti)

325-P. The Extra-Resistivity Owing to Vacancies in Copper. P. Jongenburger. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 710-711.

Calculations for the extra resistivity show that it is of the same order of magnitude as the extra-resistivity due to Ni in Cu. (P15, Cu, Ni)

326-P. Some Physical Properties of Investment Cast Alloys. K. J. Yonker. *Precision Metal Molding*, v. 11, Feb. 1953, p. 42-43.

Physical and mechanical properties of alloy and stainless steels. Tables. (P general, Q general, AY, SS)

327-P. A Survey of Present Knowledge of Thermionic Emitters. D. A. Wright. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. III, May 1953, p. 125-139; disc., p. 140-142.

Factors influencing the work function of metals. Usefulness of a number of metals as practical thermionic emitters. Effect of adsorbed films, illustrated in connection with emitters with monatomic layers of Th, Cs, and Ba. Behavior and limitations of Ba-Sr-O type of cathode. Tables. 70 ref. (P15, Ba, Th, Cs, Sr)

328-P. Antiferromagnetic Structure in Cr_2O_3. B. N. Brockhouse. *Journal of Chemical Physics*, v. 21, May 1953, p. 961-962.

Investigation of magnetic structure by neutron diffraction studies of powdered Cr_2O_3 at 22 and −193° C. using neutrons of wavelength 1.303A obtained from a crystal spectrometer. 6 ref. (P16, M22, Cr)

329-P. "Cond-Al". A Tailor-Made Aluminum Alloy of High Creep Strength and Conductivity. R. H. Harrington, L. B. Barker, M. F. Sayre, and C. H. Holley. *Metal Progress*, v. 63, May 1953, p. 90-94.

Investigation to produce a commercially available alloy with electrical conductivity close to that of E. C. Al but with greatly improved rupture and tensile properties; higher recrystallization temperature; and greater resistance to compression creep at operating temperatures. Tables. (P15, Q3, T1, Al)

330-P. Measuring Methods for Some Properties of Ferroxcube Materials. C. M. van der Burgt, M. Gevers, and H. P. Wijn. *Philips Technical Review*, v. 14, no. 9, Mar. 1953, p. 245-256.

A resonance method is applied for measurement of the permeability and the losses of Ferroxcube materials in weak fields. Measuring circuit consists of either lumped network elements or a coaxial line with or without a lumped inductance or capacitance. Diagrams. (P16)

331-P. Table of Isotopes. J. M. Hollander, I. Perlman, and G. T. Seaborg. *Reviews of Modern Physics*, v. 25, Apr. 1953, p. 469-651.

Table presents data on all isotopes known in Dec. 1952. Reference data. (P13)

332-P. (English.) **Ionic Currents in Thin Films of Zirconium Oxide.** A. Charlesby. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 340-347.

Ionic currents and laws of growth. Optical methods show film to be uniform in structure. Optical and capacity measurements were used to measure thickness. Effect of varying type of electrolyte was studied. Graphs, tables. (P15, P17, Zr)

333-P. (English.) **Electron and Photocurrents in Thin Films of Zirconium Oxide.** A. Charlesby. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 348-354.

Flow of electron and photo-electric currents when electrostatic fields are applied across thin oxide films formed on Zr by electrolytic means. Tables, graphs. (P15, Zr)

334-P. (English.) **Specific Heat and Energy of Transformation of Mg_3Cd.** B. Welber, R. Webeler, and F. Trumbore. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 374-376.

Determination of specific heat between 50 and 200° C. (P12, Mg, Cd)

335-P. (German.) **Fission of Beryllium by Mesons.** A. P. Shdanow, P. I. Lukirskij, and S. S. Sokolowa. *Chemische Technik*, v. 5, no. 1, Jan. 1953, p. 22-23.

By meson bombardment a single highly ionized particle of Be was split off. The particle has two neutrons. 4 ref. (P10, Be)

336-P. (German.) **A New Kind of Heat Transfer.** Otto Schaaber. *Umschau in Wissenschaft und Technik*, v. 53, no. 6, Mar. 1953, p. 163-166.

Transfer in a melt of pure metal in stationary status was tested. Conductors are considered as perfectly arranged areas of molecules which have higher specific gravity than the surrounding melt and are attracted by convection currents to the hotter side. Graphs, diagrams. (P11)

337-P. (German.) **Results of Low-Temperature Testing. X. Atomic Heat of Indium Between 12° and 273° K.** Klaus Clusius and Liselotte Schachinger. *Zeitschrift für angewandte Physik*, v. 4, no. 12, Dec. 1952, p. 442-444.

Atomic heat is represented as a function of a definite Debye characteristic temperature. (P12, In)

338-P. (German.) **Nuclear Photo Effect on Beryllium at High Energies.**

Herbert Uberall. *Zeitschrift für Naturforschung,* v. 8a, nos. 2-3, Feb.-Mar. 1953, p. 142-148.

Theoretical discussion. (P12, Be)

339-P. The Specific Heat of Beryllium at Low Temperatures. R. W. Hill and P. L. Smith. *Philosophical Magazine,* v. 44, June 1953, p. 636-644.

Measurements were made from 4 to 300° K. Results obtained are consistent with the most recent high-temperature data but are markedly different from existing low-temperature work. (P12, Be)

340-P. The Thermal and Electrical Conductivities of Beryllium. R. W. Powell. *Philosophical Magazine,* v. 44, June 1953, p. 645-663.

Several samples of metallic Be were studied. Heat treatment to 700° C. caused increases in the thermal and electrical conductivities. Determinations of these properties were made for as received and heat treated states. Graphs, tables. (P11, P15, Be)

341-P. Thermionic Constants of Metals and Semiconductors. III. Monovalent Metals. S. C. Jain and K. S. Krishnan. *Royal Society, Proceedings,* v. 217, ser. A, May 21, 1953, p. 451-461.

Measurements on the thermionic constants of Cu, Ag and Au made by the effusion method. (P15, Cu, Ag, Au)

342-P. The Kinetics of Chemisorption of Hydrogen and Carbon Monoxide on Evaporated Iron Films. A. S. Porter and F. C. Tompkins. *Royal Society, Proceedings,* v. 217, ser. A, May 21, 1953, p. 529-544.

Investigation at liquid-air temperatures. Graphs, tables. (P13, Fe)

343-P. The Sorption of Hydrogen and Other Gases by Evaporated Iron Films. A. S. Porter and F. C. Tompkins. *Royal Society, Proceedings,* v. 217, ser. A, May 21, 1953, p. 544-554.

Sorption of H_2, CO and N_2 on evaporated Fe films was investigated. Evaluation of the surface areas from chemisorption data. Graphs, tables. (P13, Fe)

344-P. (English.) **The Decay Energies of Pb^{209} and Si^{31}.** A. H. Wapstra. *Arkiv för Fysik,* v. 6, no. 3, 1953, p. 263-267.

Intermediate image β-spectrometer was calibrated with electron lines of known energy. β-decay energies of Pb^{209} and Si^{31} were determined. Tables, graphs. (P13, Pb, Si)

345-P. (French.) **Iron Nitriding in the Neighborhood of the Curie Ferromagnetic Point.** Georges Nury and Hubert Forestier. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 15, Apr. 13, 1953, p. 1487-1489.

The velocity of nitriding has two very marked discontinuities at 740 and 760° C, expressed by two sharp maxima. The first is due to ferromagnetic transformation of a Fe-N solid solution, the second to the Curie point of Fe. (P16, Fe)

346-P. (German.) **Electrical Behavior of Thin Metallic Layers.** A. Schulze and H. Eicke. *Metall,* v. 7, Feb. 1953, p. 106-108.

Research set-up and related procedures. (To be continued.) (P15)

347-P. (German.) **A New Class of Permanent Magnet Materials.** *Umschau in Wissenschaft und Technik,* v. 53, no. 9, May 1, 1953, p. 265-266.

New metallic oxides. (P16, Fe, Co)

348-P. (German.) **The Vapor Pressure of Magnesium Over Its Binary Molten Alloys With Antimony and Bismuth. XV. The Thermochemistry of Alloys.** F. A. Vetter and O. Kubaschewski. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 4, 1953, p. 243-247; disc. p. 247-248.

Reactivity of Mg in the melts can be determined from the vapor pressures, heats and entropies of solution, and temperature coefficients. Tables, graphs. 15 ref. (P12, Mg, Sb, Bi)

349-P. (German.) **New Semiconducting Compounds. II.** H. Welker. *Zeitschrift für Naturforschung,* v. 8a, no. 4, Apr. 1953, p. 248-251.

Conductivity measurements on InSb, GaSb, and AlSb as functions of temperature. Charts, tables. (P15, In, Ga, Al, Sb)

350-P. Theory of Magnetic Effects on the Noise in a Germanium Filament. Harry Suhl. *Bell System Technical Journal,* v. 32, May 1953, p. 647-664.

Quantitative theory of the magnetic effect. Graphs. (P16, Ge)

351-P. Transmission Properties of Laminated Clogston Type Conductors. E. F. Vaage. *Bell System Technical Journal,* v. 32, May 1953, p. 695-713.

Transmission properties are discussed by introducing the concepts of equivalent inductance, capacitance, and resistance values which are analogous to their corresponding counterparts in the treatment of ordinary transmission lines. From these constants the attenuation, phase constant, and speed of propagation are obtained using conventional transmission line theory. Results are compared with those for ordinary coaxial conductors. Diagrams. (P15, Cu)

352-P. On the Temperature Sensitivity of Special Magnetic Materials. T. A. Heddle. *British Journal of Applied Physics,* v. 4, June 1953, p. 161-166.

Magnetic materials which are sensitive to temperature from −60 to +120° C. Applications of these materials to temperature detecting and compensating devices. Graphs. 40 ref. (P16, T8, SG-n, p)

353-P. Kinetics of Silver-Silver Ion Exchange. A. Baerg and C. A. Winkler. *Canadian Journal of Chemistry,* v. 31, June 1953, p. 521-527.

Results of investigation made of the exchange kinetics on etched Ag surfaces. (P13, Ag)

354-P. Acoustic Wave Velocities, Elastic Constants, and Debye Characteristic Temperature for Polycrystalline MgCd. Charles S. Smith and W. E. Wallace. *Journal of Chemical Physics,* v. 21, June 1953, p. 1120.

8 references. (P17, Q21, Mg, Cd)

355-P. Electrical Resistance of Titanium Metal. James L. Wyatt. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 903-905.

Electrical resistance as a function of purity and temperature was measured from −325 to 2800° F. Two points of inflection in the data plots were found. An increase in resistance with increase in temperature above the transformation was observed. Tables. (P15, Ti)

356-P. "Color" and Reflectance of Stainless Steels. F. K. Bloom. *Metal Progress,* v. 63, June 1953, p. 67-72.

Physical measurements. How variations in composition affect reflectance properties; effects of different polishing methods. Diagrams, photographs. (P17, L10, SS)

357-P. A Theory of Ferromagnetism. Linus Pauling. *National Academy of Sciences of the United States of America, Proceedings,* v. 39, June 1953, p. 551-560.

Formulation of a theory that seems to provide a simple explanation of the phenomenon. 16 ref. (P16)

358-P. Gamma-Ray Output of Radium. A. Ghosh, J. Kastner, and G. N. Whyte. *Nucleonics,* v. 11, June 1953, p. 70-72.

Cavity-chamber measurements of Ra γ-ray output in 0.5-mm Pt. (P13, Ra)

359-P. Space-Charge Limited Hole Current in Germanium. G. C. Dacey. *Physical Review,* v. 90, June 1, 1953, p. 759-763.

Theory and experiment for hole flow in Ge at liquid air temperature. (P15, Ge)

360-P. Mobility of Holes and Electrons in High Electric Fields. E. J. Ryder. *Physical Review,* v. 90, June 1, 1953, p. 766-769.

Field dependence of mobility was determined for electrons and holes in Ge and Si. Graphs. (P15, Ge, Si)

361-P. High Field Mobility in Germanium With Impurity Scattering Dominant. E. M. Conwell. *Physical Review,* v. 90, June 1, 1953, p. 769-772.

Experimental measurements show a variation of mobility with electric field intensity of electrons in *n*-type Ge which differs at 20° K. from that observed in the same specimen at 77° K. and higher temperatures. (P15, Ge)

362-P. Gamma-Gamma Directional Correlations in Co^{59}, Xe^{131}, and Hg^{198}. D. Schiff and F. R. Metzgers. *Physical Review,* v. 90, June 1, 1953, p. 849-852.

Directional correlations of low intensity γ−γ cascades were measured using NaI scintillation counters in a coincidence arrangement of 1.5×10^{-8} sec. resolving time. Graphs. (P13, Co, Hg)

363-P. Search for Double Beta-Decay in Sn^{124} and Zr^{96}. John A. McCarthy. *Physical Review,* v. 90, June 1, 1953, p. 853-857.

Results which indicate that double β-decay may occur in Zr^{96} without the emission of neutrons. (P13, Zr, Sn)

364-P. Resonance Scattering in Indium. L. B. Borst. *Physical Review,* v. 90, June 1, 1953, p. 859-862.

Resonance scattering from the 1.458-ev level of In was studied by a bright-line technique. Graphs. (P10, In)

365-P. The Disintegration of Sc^{47}. L. S. Cheng and M. L. Pool. *Physical Review,* v. 90, June 1, 1953, p. 886-888.

Radiations accompanying the disintegration of Sc^{47} were investigated with a lens spectrometer and a scintillation spectrometer. Graphs. (P13, Sc)

366-P. Disintegration of 24-Minute Ag^{106}. W. L. Bendel, F. J. Shore, H. N. Brown, and R. A. Becker. *Physical Review,* v. 90, June 1, 1953, p. 888-890.

The 24-min. isomer of Ag^{106} was produced by the (γ, n) reaction on metallic Ag. A conversion line of a 512-kev γ-ray was found. Conversion lines of 66-min. half-life were found in Ag following bombardment of Pd by deuterons. (P13, Ag, Pd)

367-P. The Multiplicity of Neutrons From the Interaction of μ-Mesons at Rest in Pb, Bi, Sn, and Al. M. Widgoff. *Physical Review,* v. 90, June 1, 1953, p. 891-899.

Average multiplicity of neutrons emitted from a nucleus which has absorbed a μ-meson were determined. Graphs, tables. (P10, Pb, Bi, Sn, Al)

368-P. Electron Spin Resonance in a Silicon Semiconductor. A. M. Portis, A. F. Kip, C. Kittel, and W. H. Brattain. *Physical Review,* v. 90, June 1, 1953, p. 988-989.

Study of electron spin resonance absorption in the 9000 megacycle per sec. range in a powdered *n*-type Si semiconductor specimen at temperatures between 4 and 300° K. (P15, Si)

369-P. Decay of Ga^{64} and Ga^{65}. Bernd Crasemann. *Physical Review,* v. 90, June 1, 1953, p. 995-996.

Experiments. (P13, Ga)

370-P. Formation and Decay of Mo^{93m}. C. W. Forsthoff, R. H. Goeckermann, and R. A. Naumann. *Physical Review,* v. 90, June 1, 1953, p. 1004-1005.

Experimentation. (P13, Mo)

371-P. The Photodisintegration Cross Section of Beryllium at 2.185 Mev. Bernard Hamermesh and Clyde Kimball. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1063-1065.

Measurement of the cross section using γ-rays. Graphs, table. 11 ref. (P10, Be)

372-P. The Neutron Activation of Ca. L. G. Cook and K. D. Shafer. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1121.

Describes irradiated Ca. 5 ref. (P10, Ca)

373-P. Neutron Capture Cross Section of Em^{222}. A. P. Baerg. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1121.

Experiments measuring the cross section of Rn for slow neutron capture in the RX reactor. Table. (P10, Rn)

374-P. The Optical Constants of a Single Crystal of Germanium. D. G. Avery and P. L. Clegg. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 512-513.

Graphs. 6 ref. (P17, Ge, Pb)

375-P. The Thermal Conductivity of Gold at Low Temperatures. G. K. White. *Physical Society, Proceedings,* v. 66, sec. A, June 1953, p. 559-564.

Cryostat, experimental technique, and results. Diagrams. 14 ref. (P11, Au)

376-P. A Simple Varying Capacitor Method for the Measurement of Contact Potential Difference in High Vacuum. H. P. Myers. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 493-499.

Apparatus based on Kelvin's method for measuring contact potential difference, suitable for use in vacua of 10^{-8}mm. Hg. Diagram. 4 ref. (P15, Cu, Ag, Hg)

377-P. (German.) **Properties of Silver Separated by Electrodeposition Dependent on Separation Conditions.** Paul Walter. *Metalloberfläche,* v. 7, no. 2, Feb. 1953, p. B32-B35.

Reaction polarization as the determinative influence which is applicable to metals of high melting point. Graphs. 3 ref. (P15, C28, Ag)

378-P. The Electrical Resistivity of Cast Iron. K. B. Palmer. *British Cast Iron Research Association,* v. 4, June 1953, p. 571-585.

Summary of literature on electrical resistivity and results obtained from bars cast in the BCIRA laboratories. Tables. 8 ref. (P15, CI)

379-P. An Instability of Self-Saturating Magnetic Amplifiers Using Rectangular Loop Core Materials. S. B. Batdorf and W. N. Johnson. *Communication and Electronics,* July 1953, p. 223-227; disc., p. 227-228.

On basis of experimental data a simple phenomenological theory was developed to account for the B-H characteristics of rectangular hysteresis loop core material such as "Hipernik V". Diagrams. (P16, SG-n)

380-P. Simultaneous Determination of the Surface Tension of Tin and Its Contact Angle With Silica by the Use of Conical Capillaries. D. V. Atterton and T. P. Hoar. *Institute of Metals, Journal,* v. 81, July 1953, p. 541-551.

Graphs, diagrams, tables. 17 ref. (P10, Sn)

381-P. Alternating-Current Energy Losses in Iron Laminations at Magnetic Saturation. F. Brailsford and C. G. Bradshaw. *Nature,* v. 172, July 4, 1953, p. 35-36.

Method for determining specific iron losses of materials used for alternating flux densities greater than 75% saturation value. (P16, Fe)

382-P. The Specific Heat Discontinuity in Antiferromagnets and Ferrites. Louis N. Howard and J. Samuel Smart. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 17-19.

Calculations show that in a molecular field approximation, internal energy and specific heat of a ferromagnet and antiferromagnet have the same form. Number of sets of neighbors whose interactions are considered and of the signs of the interactions have no effect. Graphs. 9 ref. (P12)

383-P. Hall Effects of the Cobalt Nickel Alloys and of Armco Iron. Simon Foner and Emerson M. Pugh. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 20-27.

Experimental data and use of a two-band model. Diagrams, graphs. 25 ref. (P15, Co, Ni, Fe)

384-P. Some Magnetic Properties of Gadolinium Metal. J. F. Elliott, S. Legvold, and F. H. Spedding. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 28-30.

Saturation magnetization and Curie point determinations of Gd. Graphs. 8 ref. (P16, Gd)

385-P. The Parameters for the Slow Neutron Resonance in Rhodium. V. L. Sailor. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 53-57.

Accurate values of the Dreit-Wigner parameters and shape of the resonance. Graphs, tables. 16 ref. (P16, Rh)

386-P. The Disintegration of Sr^{91} and Y^{91m}. D. P. Ames, M. E. Bunker, L. M. Langer, and B. M. Sorenson. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 68-74.

Data on the decay of Sr and Y. Graphs, tables. 13 ref. (P13, Sr, Y, Zr, Al, Fe)

387-P. Gallium-64. Bernard L. Chohen. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 74-75.

New isotope. Graphs. (P13, Ga)

388-P. The Decay of Au^{197m}. J. W. Mihelich and A. De-Shalit. *Physical Review,* v. 91, ser. 2, July 1, 1953, p. 78-81.

Experimental procedure and a consistent decay scheme. Tables, graph. 12 ref. (P13, Au, Hg)

389-P. Ferromagnetic Domains. H. J. Williams. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 251-277.

Very simple process of showing the above by using colloidal magnetite and microscope. Magnetic orientation is shown by magnetite behavior at fine mechanical scratches. Some Kerr magneto-optic work. (P16, SG-n)

390-P. Radiation Damage as a Metallurgical Research Technique. Sidney Siegel. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 312-325.

Irradiation of Cu, an order-disorder alloy (Cu_3Au) and a precipitation-hardening alloy (Cu plus 2% Be). Effect on electrical conductance was greater than theoretical predictions. (P10, P15, Cu)

391-P. (French.) Study of Thermodynamic Properties of the Reductions of Oxides of Tungsten by Hydrogen and Carbon Monoxide (and Direct Reduction of the WO_3 Anhydride at High Temperature). Jean Venturini. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 102-126.

Thermochemistry of reactions of dissociation, oxidation, and reduction of oxides of W. Tables, graphs. 35 ref. (P12, W)

392-P. (Russian.) On Chemical Transformations Preceding Ordering of a 50% Alloy of Iron With Cobalt. N. V. Grum-Grzhimailo. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 1, Nov. 1, 1952, p. 57-58.

Variation of the galvanomagnetic effect with increasing temperatures from 25 to 800° C. 4 ref. (P16, Fe, Co)

393-P. (Russian.) Effect of Surface Active Substances on the Electrode Potential. A. I. Levin, E. A. Ukshe and V. S. Kolevatova. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no 1, Nov. 1, 1952, p. 97-100.

Effect of very small additions of various substances on the magnitude of the electrode potential of Zn and Cu. Tables. 9 ref. (P15, Zn, Cu)

394-P. (Russian.) Ferromagnetic Resonance in Parallel Conductors as Dependent on Temperature and Hysteresis. A. G. Kotov. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 3, Nov. 21, 1952, p. 373-375.

Resonance curves for Ni at 25 and 80° at 18 kg. per min. tension and 3.2 cm wavelength Graphs. 6 ref. (P16, Ni)

395-P. (Russian.) Device for the Thermomagnetic Processing of Permanent Magnets. Ia. M. Dovgalevskii. *Promyshlennaia Energetika,* v 9, no. 8, Aug. 1952, p. 7-9.

New 2-section fixed magnetizing apparatus which accelerates the preparation of permanent magnets from anisotropic alloys. Drawing, photograph. (P16, SG-n)

396-P. (Book.) Introduction to Solid State Physics. Charles Kittel. 396 p 1953. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $7.00.

Classification of solids and crystal structure, lattice energy of ionic crystals, elastic constants of crystals, lattice vibrations, thermal properties of solids, dielectric properties, and ferro-electric crystals are among the topics covered. Includes diamagnetism and paramagnetism, ferromagnetism and antiferromagnetism, superconductivity, free electron and band theory of models.

semiconductors, and imperfections in solids.
(P general, Q21, N general)

397-P. (Book.) **Permanent Magnets.** 59 p. Permanent Magnet Assoc., 301 Glossop Rd., Sheffield 10, England. 10s net.
Development work done at Permanent Magnet Assoc. and recent achievements in the field. Includes theory of magnetism, magnet design, compositions and properties of magnetic materials, and a glossary of technical terms. (P16, SG-n)

398-P. (Book.) **Progress in Metal Physics.** v. 4. Bruce Chalmers, editor. 403 p. 1953. Interscience Publishers, Inc., 250—5th Ave., New York 1, N. Y. $9.00.
Authoritative information on the current state of knowledge in specialized aspects of the field that includes both physical metallurgy and metal physics.
(P general, M general, N general)

399-P. Low Temperature Heat Capacities of Inorganic Solids. XVII. Heat Capacity of Titanium from 15 to 305° K. Charles W. Kothen and Herrick L. Johnston. *American Chemical Society, Journal,* v. 75, July 5, 1953, p. 3101-3102.
Thermal functions are calculated and tabulated over above range. Entropy at 298.16° K. is 7.33±0.02 e.m. (P12, Ti)

400-P. The Heat of Combustion of Lanthanum. Elmer J. Huber, Jr. and Charles E. Holley, Jr. *American Chemical Society, Journal,* v. 75, July 20, 1953, p. 3594-3595.
Determined by oxidation at 25 atmospheres pressure in an O_2 bomb calorimeter. Value determined to be 6439.2±2.9 joules per gram.
(P12, La)

401-P. The Anomalous Skin Effect and the Reflectivity of Metals. Evaluation of the Integrals Appearing in the Expressions for the Surface Impedance. R. B. Dingle. *Applied Scientific Research,* v. 3, sec. B, 1953, p. 69-99.
Theoretical analysis. (P17)

402-P. On the Geometrical Arrangement in Hall Effect Measurements. V. Frank. *Applied Scientific Research,* v. 3, sec. B, 1953, p. 129-140.
Short-circuiting effect of current electrodes in Hall effect measurements is given for an arbitrary geometrical arrangement. Shows that (for singly connected geometries) the correction to be applied is given by a universal function of only one parameter which is characteristic of the geometry and which can be determined by measurement. Theory is experimentally verified for a particular geometry by measurements on Cu. Diagrams. (P15, Cu)

403-P. Note on Some Neutron Capture γ-Rays From Magnesium. B. B. Kinsey and G. A. Bartholomew. *Canadian Journal of Physics,* v. 31, July 1953, p. 901-902.
Describes experiments. (P13, Mg)

404-P. A Method of Determining Electrical Resistivities at Low Temperatures. David C. Baird and Willard S. Boyle. *Journal of Applied Physics,* v. 24, July 1953, p. 958.
Method to correlate thermal and electrical conductivities of certain Cu specimens at liquid He temperatures. Graphs. (P11, P15, Cu)

405-P. Effect of Particle Size on Magnetic Loss Tangent of Obstacle Type Artificial Dielectrics. J. M. Kelly and J. O. Stenoien. *Journal of Applied Physics,* v. 24, July 1953, p. 962-963.
Behavior of Al powder suspended in a dielectric binder. Photomicrographs and graph. (P16, H11, Al)

406-P. The Specific Heat of Crystalline Selenium at Low Temperatures. Warren Desorbo. *Journal of Chemical Physics,* v. 21, July 1953, p. 1144-1148.
Tests were made down to 15° K. Values agree to 37° K. but show anomalies below this. Entropy, enthalpy, and free energy are tabulated to 300° K. (P12, Se)

407-P. A Study of the Formation of Iron Percarbide. John J. Mitchell. *Journal of Chemical Physics,* v. 21, July 1953, p. 1153-1159.
$C^{14}O_2$ used at temperatures from 170 to 321° C. shows that percarbide (Fe_2C) forms on scattered nuclei. C is firmly held and surface of partially carbided iron is covered by percarbide. (P13, Fe)

408-P. Charge-Transfer No-Bond Adsorption of Inert Atoms or Molecules on Metals. J. C. P. Mignolet. *Journal of Chemical Physics,* v. 21, July 1953, p. 1298.
Describes above for gases such as He, Ne, A, Kr, and Xe on K, Ca, Ti, Cr, Fe, Ni, Zn, Se, W and Hg. Results are explained on basis of a donor-acceptor interaction.
(P15, Ti, Cr, Fe, Ni, Zn, Se, W, Hg)

409-P. Thermal Conductivity of Nodular Iron. M. J. Sinnott. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1016.
Data on conductivity of five irons. Tables. 4 ref. (P11, Fe)

410-P. Silicon-Oxygen Equilibrium in Liquid Iron. A Revision. John Chip-

man and Nev A. Gokcen. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1017-1018.

Revised relation between concentration of silicon and activity coefficient of oxygen in liquid iron. New values of thermodynamic properties of the liquid solution. 10 ref. (P12, Fe, Si)

411-P. Some Thermal Properties of Point-Contact Germanium Diodes. J. R. Tillman and J. C. Henderson. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 677-696.

Experimental methods and resulting data. Diagrams, graphs. 10 ref. (P11, P15, Ge)

412-P. The Electrical Resistivity of Liquid Iron. R. W. Powell. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 772-775.

Compares the resistivity in molten and solid state. Graph. 6 ref. (P15, Le)

413-P. Heat Conductivities of Superconductive Sn, In, Tl, Ta, Cb, and Al Below 1° K. K. Mendelssohn and C. A. Renton. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 776-781.

Graphs. 10 ref. (P11, Sn, In, Tl, Ta, Cb, Al)

414-P. Experimental Confirmation of Relation Between Pulse Drift Mobility and Charge Carrier Drift Mobility in Germanium. M. B. Prince. *Physical Review,* v. 91, ser. 2, July 15, 1953, p. 271-272.

Graphs. 5 ref. (P15, Ge)

415-P. Electron Current in Thin Oxide Films on Aluminium. A. Charlesby. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 533-541.

Relationship between electron current, voltage across the film, film thickness and temperature. Tables, graphs. (P15, Al)

416-P. Injected Absorption in Germanium. A. F. Gibson. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 588-596.

Basic transistor action was studied as a function of wave length, injected current, frequency, and other relevant parameters. Theory is discussed and agreement found with experimental results. Graphs. (P15, Ge)

417-P. Thermal Effects Accompanying Magnetization of a Ferrimagnetic Material. L. F. Bates and N. P. R. Sherry. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 609-610.

Measurements made on thermal changes which occur when a ferromagnetic metal or alloy goes through an ordinary hysteresis cycye. (P11, P16, SG-n, p)

418-P. The Influence of Domain Structure on the Magnetization Curves of Single Crystals. E. W. Lee. *Physical Society, Proceedings,* v. 66, pt. 7, July 1953, p. 623-630.

By using Néel's model for the domain structure of a single crystal of Fe, magnetization curves were calculated. Calculated curves were compared with experimental results of Williams. Diagrams. (P16, Fe)

419-P. The Thermal Conductivity of Metals in High Magnetic Fields at Low Temperatures. K. Mendelssohn and H. M. Rosenberg. *Royal Society, Proceedings,* v. 218, ser. A, June 1953. p. 190-205.

Measurements between 2 and 4.5° K. of 27 pure metals subjected to a magnetic field of 4kOe. Graphs. 24 ref. (P11, P16)

420-P. A Theoretical Calculation of the Stored Energy in a Work-Hardened Material. A. N. Stroh. *Royal Society, Proceedings,* v. 218, ser. A, July 7, 1953, p. 391-400.

Evaluates energy due to piled-up groups. Graphs, tables. 22 ref. (P12)

421-P. (English.) Thermodynamic Activities in Iron-Nickel Alloys. R. A. Oriani. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 448-454.

Fe activity in Fe-Ni alloys was studied in differential apparatus by equilibrating mixtures of H_2O/H_2 gases over pure Fe and alloys. Tables, graphs. 20 ref. (P12, Fe, Ni)

422-P. (English.) Spin-Orbit Coupling Effects in Ferromagnetic Metals. G. C. Fletcher. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 467-468.

Experiments using Ni. (P16, Ni)

423-P. (French.) Thermal Conductivity in Furnace Construction Materials. Antonio Rasi. *Chaleur & Industrie,* v. 34, no. 334, May 1953, p. 117-123.

In connection with degree of porosity, weight, specific gravity, moisture absorption and cost. Tables, diagrams, graphs. 12 ref. (P11)

424-P. (French.) Magnetic Properties and the Distribution of Electrons in Some Alloys and Compounds. G. Foex. *Helvetica Physica Acta,* v. 26, nos. 3-4, 1953, p. 199-206.

Experimental work. Tables, graphs. 12 ref. (P16, SG-n)

425-P. (German.) Materials Testing With Gamma and Beta Rays. II. Gamma-Ray Emitting Products and Their Handling; Protection Against Radiation. E. A. W. Müller. *Archiv*

für technisches Messen, no. 209, June 1953, p. 131-134.

Radioactive Ir, Ta and Co products. Effect of atomic radiation on the human body and protective measures. Tables, photographs. (P13, S19, Ir, Ta, Co)

426-P. (German.) **Determining the Surface Tensions of Several Types of Cast and Pig Iron.** K. Grütter and B. Marincek. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 171-173.

Method of measuring above. Graphs, tables. 11 ref. (P10, Fe)

427-P. (German.) **Excitation Conditions of Titanium by Aid of γ-γ Angle Correlation.** Peter Meyer and Siegfried Schlieder. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 119-124.

Shows first excitation to possess spin 2, the second, spin 4, both transitions taking place by quadrupole radiation. Diagrams, graphs. 17 ref. (P10, Ti)

428-P. (German.) **Electron Emission by Metals as an Aftereffect of Irradiation.** Karlheinz Seeger. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 152-162.

Emission measurements of metals after irradiation by X-rays; ultraviolet and visible light; and after luminous discharge. Dependencies on time, temperature, wave length of radiation and surface structure of metal. Graphs. 40 ref. (P10)

429-P. (German.) **Meaning of Optical Constants of the Alkali Metals.** Herwig Schopper. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 163-167.

Shows that experimental and theoretical values of the constants can be brought to agreement. Free electrons/cm^3 and vaporization constants can be computed from the experimental values. 17 ref. (P17, EG-e)

430-P. (German.) **The Chemical Bond in Monocarbides and Its Correlation to Hardness.** H. Nowotny and F. Vitovec. Paper from "Plansee Proceedings 1952". Metalwerk Plansee Ges. M. B. H., p. 39-48; disc., p. 48.

Theories of bonding in lattices of intermetallic phases. Investigates to what extent simple relationships can be expected between the type of bonding and specific properties such as hardness. Diagrams. 25 ref. (P13, Q29)

431-P. (Russian.) **Properties of Superconductive Films of Tl and In.** N. V. Zavaritskii. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 4, Aug. 1, 1952, p. 749-752.

Studies were made in a magnetic field. Graphs. 5 ref. (P15, Tl, In)

432-P. (Russian.) **Solubility and Activity of Oxygen in Iron and Vanadium Melts.** R. A. Karasev, A. Iv. Poliakov and A. M. Samarin. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 6, Aug. 21, 1952, p. 1313-1316.

Experimental and theoretical data. 4 ref. (P12, Fe, Va)

433-P. (Russian.) **Thermal Diffusion in Metals.** I. A. Oding. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 1, Sept. 1, 1952, p. 67-70.

Basic principles. 4 ref. (P12)

434-P. (Russian.) **Temperature Dependence of Surface Tension of Bismuth and Its Alloys With Sodium and Potassium.** P. P. Pugachevich and I. P. Altynov. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 1, Sept. 1, 1952, p. 117-119.

Drop method was used. Glass apparatus. Graphs. 9 ref. (P12, Bi, Na, K)

435-P. (Russian.) **Superconductivity of Bismuth.** N. V. Zavaritskii. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 687-690.

Films of Ag, Cu, Mg, Sb, and Bi condensed on glass surface at 2° K. were studied. 7 ref. (P15, Bi, Ag, Cu, Mg, Sb)

436-P. (Russian.) **Basic Types of Composition — Heat Resistance Diagrams of Metallic Substances.** I. I. Kornilov. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 721-724.

Three types of diagrams distinguished by the use of continuous, limited and very limited solid solutions. It was found that heat resistance of solid solution alloys is greater than that of heterogeneous alloys. (P11, SG-h)

437-P. (Russian.) **Effect of pH on Electrochemical Behavior and Corrosion Resistance of Metals.** A. Ia. Shatalov. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 775-777.

Measurements of electrode potentials of 12 metals. (P15, R general, Ag, Cu, Mg, Zn, Cd, Al, Pb, Sn, Bi, Mo, W, Mn)

438-P. (Russian.) **Variation of Electric Resistance and of Thermal Electromotive Force of the Alloy Fe_3Pt in Longitudinal and Transverse Magnetic Fields.** R. G. Annaev and M. V. Kolodin. *Doklady Akademii Nauk, SSSR,* v. 87, new ser. no. 2, Nov. 11, 1952, p. 195-196.

After tempering at 1000° C. in vacuum for 2 hr., the galvanomagnetic effects remained the same. Graphs, 6 ref. (P15, P11)

439-P. (English.) **The Magnetoresistances of Alloys of a Noble Metal and**

a Transition Metal at Low Temperatures. A. N. Gerritsen. *Physica,* v. 19, nos. 1-2, Jan.-Feb. 1953, p. 61-73.
Resistance of dilute alloys of Cu and Au with Mn and Cr were measured in magnetic fields. Tables, graphs. 10 ref.
(P16, Cu, Au, Mn, Cr)

440-P. (English.) **Magnetic Compounds With Perovskite Structure. III. Ferromagnetic Compounds of Cobalt.** G. H. Jonker and J. H. Van Santen. *Physica,* v. 19, nos. 1-2, Jan.-Feb. 1953, p. 120-130.
Polycrystalline solid solutions of (La, Sr) CoO_3 were prepared and tested. Tables, graphs, diagrams. 9 ref. (P16, Co)

441-P. (English.) **The Anomalous Skin Effect and the Reflectivity of Metals. I.-II. Comparison Between Theoretical and Experimental Optical Properties.** R. B. Dingle. *Physica,* v. 19, no. 4, Apr. 1953, p. 311-364.
Part I: attempt is made to extend and improve the evaluation of Reuther and Sondheimer's formal expressions. Part II: Numerical magnitudes of the parameters and derived quantities for actual metals. Compares theoretical results with existing experimental data. Tables. 47 ref.
(P17, Na, Cu, Ag, Au, Pt, W, Al, Pb, Sn)

442-P. (English.) **A Method for the Measurement of the Thermal Expansion of Solids Between 0 and −180° C.** A. Michels, T. Wassenaar, and Th. N. Zwietering. *Physica,* v. 19, no. 4, Apr. 1953, p. 371-373.
Method allows a rapid determination of the coefficient of linear expansion of a solid. Diagrams. (P11)

443-P. (English.) **The Cooperative Electron Phenomenon in Dilute Alloys.** J. Korringa and A. N. Gerritsen. *Physica,* v. 19, no. 6, June 1953, p. 457-507.
Electrical resistance as function of temperature, concentration and strength of magnetic field. Graphs, tables. 17 ref.
(P15, P16, Al, Cu, Ag, Mg, Au)

444-P. (Dutch.) **Copper and Copper Alloys. II. Malleable Phosphorus-Bronze Alloys.** W. G. R. de Jager. *Metalen,* v. 8, no. 11, June 15, 1953, p. 234-235.
Physical, electrical, thermal and corrosion properties. Tables.
(P general, R general, Cu)

445-P. (French.) **Study of Infrared Photoluminescence of Activated Cadmium Sulfide in Copper.** Edmond Grillot and Pierre Guintini. *Comptes rendus,* v. 236, no. 8, Feb. 23, p. 802-804.
Experimental data. Graph, diagram. 5 ref. (P17, Cu, Cd)

446-P. (French.) **Deviations From Ohm's Law When Very Thin Metallic Plates Are Studied.** Marcel Perrot and Jean-Pierre David. *Comptes rendus,* v. 236, no. 17, Apr. 27, 1953, p. 1641-1643.
Deviations observed in a vacuum at low and ordinary temperatures. (P15)

447-P. (French.) **Chemical Aspect of the Electroconductivity of Metals and Alloys.** Genevieve Sutra. *Comptes rendus,* v. 236, no. 17, Apr. 27, 1953, p. 1643-1645.
Tabulated data of temperature coefficients for Al-Cu alloys.
(P12, P15, Al, Cu)

448-P. (German.) **Permanent Magnets and Their Practical Application.** H. Fahlenbrach. *Metall,* v. 7, nos. 11/12, June 1953, p. 413-421.
Theoretical fundamentals of magnetic materials with special attention to their use in machine construction. Diagrams, graphs, photographs. 8 ref. (P16, T7, ST)

449-P. (German.) **Thermo-Electric Effects in Stressed Metals.** W. Späth. *Metall,* v. 7, nos. 11/12, June 1953, p. 430-432.
History, orientative experiments, principles of Seebeck and Peltier effects and processes occurring in stressed metals. Diagrams. 8 ref. (P15)

450-P. (Russian.) **Curves of Simultaneous Magnetization by Direct and Alternating Current Fields.** I. B. Negenvitskii, I. K. Panina, and V. P. Mishchenko. *Elektrichestvo,* no. 3, Mar. 1953, p. 63-64.
Curves are presented for "Permalloy" and Steel E 4A.
(P16, AY, SG-n)

451-P. (Russian.) **Determination of the Speed of Component Distribution in a Liquid Metal.** M. M. Karnaukhov and S. K. Chuchmarev. *Izvestiia Akademii Nauk SSSR. Otdelenie Tekhnicheskikh Nauk,* no. 1, Jan. 1953, p. 82-95.
Based on the ability of radioactive substances to radiate gamma rays. Diagrams, tables, graphs. 4 ref. (P10)

452-P. The Activities of Evaporated Metal Films in Gas Chemisorption. B. M. W. Trapnell. *Royal Society, Proceedings,* v. 218, ser. A, July 23, p. 566-577.
General mechanisms of chemisorption by later metals of transition periods, mainly those of group VIII. Table, graphs. 28 ref. (P12)

453-P. (German.) **Analysis of Angle-Correction Experiment With a Report**

of Such Measurements on Nickel. Santimay Chatterjee and Ajit Kumar Saha. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 141-151.

Analyzes assumptions for measuring corrective relationships of the various deterioration rays emitted by an active nucleus. Means of getting more accurate results are suggested. Diagrams, tables. 10 ref. (P13, Ni)

454-P. Heat Transfer to Molten Lead-Bismuth Eutectic in Turbulent Pipe Flow. H. A. Johnson, J. P. Hartnett, and W. J. Clabaugh. *ASME, Transactions,* v. 75, Aug. 1953, p. 1191-1198.

Evaluation of experimental results and comparison of results with other available liquid-metal heat-transfer data. Graphs, tables, diagrams. 18 ref. (P12, Pb, Bi)

455-P. Electrical Properties of Liquid Selenium I. H. W. Henkels and J. Maczuk. *Journal of Applied Physics,* v. 24, Aug. 1953, p. 1056-1060.

Thermo-electric power of liquid Se was measured from 250 to 500° C. Values of activation energies calculated from temperature dependences of thermo-electric powers and resistivities agree. Diagram, graphs. (P15, Se)

456-P. Effect of Cold Work and Anneal on Resistivity of Alpha Brass. Herbert I. Fusfeld. *Journal of Applied Physics,* v. 24, Aug. 1953, p. 1062-1063.

Compares results with those of Masima and Sachs. (P15, J23, Q24, Cu)

457-P. The Surface Tension of Liquid Silicon and Germanium. Paul H. Keck and Wendell Van Horn. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 512-513.

Paper presented at the American Physical Society meeting at Durham, N. C., Mar. 26-28, 1953. Surface tensions were determined by using the drop weight method. (P10, Si, Ge)

458-P. *n*-Type Surface Conductivity on *p*-Type Germanium. W. L. Brown. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 518-527.

Results of some experimental and theoretical investigations pertaining to surface conductivity. Graphs, diagrams. (P15, Ge)

459-P. Evaporation of Copper From Germanium. George Finn. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 754-755.

Vacuum heat treating introduced fewer acceptors in Ge than heat treating in He atmosphere. (P15, Ge, Cu)

460-P. Oxygen-Induced Surface Conductivity on Germanium. Edward N. Clarke. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 756-757.

Gas adsorption and resulting surface electrical conductance at 197° K. Graphs. (P15, Ge)

461-P. Thermally Induced Acceptors in Single Crystal Germanium. R. A. Logan. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 757-758.

Experimental procedure. (P15, Ge)

462-P. The Barkhausen Effect in Single Crystals. R. S. Tebble and V. L. Newhouse. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 633-641.

Experimental data and theoretical explanations for Si-Fe and Ni specimens. Graphs, table. 10 ref. (P16, Si, Fe, Ni)

463-P. Thermoelectric Effects Due to Stationary and Moving Asymmetrical Temperature Gradients in Mercury. N. Fuschillo. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 649-653.

Experimental data compared with earlier work on Cu and Pt. Diagrams. 10 ref. (P15, Hg, Cu, Pt)

464-P. Ferromagnetic Domain Processes in Single Crystal Disc Specimens of Silicon Iron. D. H. Martin. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 712-714.

Importance of surface imperfections. Diagrams. 4 ref. (P16, Fe)

465-P. Sonic Barrier Raises Heat Barrier on Metals. Allen G. Gray. *Steel,* v. 133, Aug. 31, 1953, p. 72-74.

Problems of rising skin temperatures in aircraft at high speeds. Photographs, graphs. (P12)

466-P. (German.) **The Heating of Metal Surfaces by Friction.** Wilhelm Späth. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 104-109.

Tests made with bars of Ga, Wood's metal and Pb by constant rubbing against a rotating steel disk. Cutting and wire-drawing operations and the Seebeck and Peltier effects. Diagrams, graphs. 10 ref. (P12, F28, Q9, Ga, Pb, ST, SG-d)

467-P. (German.) **The Semiconducting Properties of the Systems Potassium-Antimony, Cesium-Antimony, Potassium-Indium, and Cesium-Indium.** R. Suhrmann, and Cl. Kangro. *Naturwissenschaften,* v. 40, no. 4, 1953, p. 137-138.

Experimental results. Graphs, table. 4 ref. (P15, K, Sb, Cs, In)

468-P. (German.) **The Deformation of Germanium Surfaces.** Reiner The-

dieck. *Zeitschrift für angewandte Physik,* v. 5, no. 5, May 1953, p. 163-165.

Improvement of the rectifying properties of Ge point contacts by deforming the surface with a depression or series of depressions. The phenomenon is explained by the formation of "holes" in the crystal lattice. Diagram, micrographs. 13 ref. (P15, Q24, Ge)

469-P. (German.) The Mechanism of Point Contact Transistors. Reiner Thedieck. *Zeitschrift für angewandte Physik,* v. 5, no. 5, May 1953, p. 165-166.

Effect of deformation on the rectifying properties of Ge crystals can be eliminated by etching the deformed area. Diagrams, graphs, micrographs. 5 ref. (P15, Q24)

470-P. Equilibrium of Solid α-Silver-Zinc Alloys With Zinc Vapor. George Scatchard and Roy A. Westlund, Jr. *American Chemical Society, Journal,* v. 75, Sept. 5, 1953, p. 4189-4193.

Studied by examination of spectra at 3076 A. under 1 mm. pressure. Alloys contained 0 to 30% Zn. Diagram, graphs, tables. 10 ref. (P12, Ag, Zn)

471-P. Cp-Cv in Silicon and Germanium. M. E. Fine. *Journal of Chemical Physics,* v. 21, Aug. 1953, p. 1427.

Experimental data. Values do not agree with those estimated by the Nernst-Lindemann relation. Graph. 8 ref. (P15, Si, Ge)

472-P. Solution of Metals in Fused Salts. Daniel Cubicciotti. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1106-1108.

Measurements of solubilities of some metals in their fused halides and effect of added salts on these solubilities. A structural model for the solution of metal in salts is presented to explain experimental data. Graphs. (P13)

473-P. Reaction of Silver With Aqueous Solutions of Cyanide and Oxygen. G. A. Deitz and J. Halpern. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1109-1116.

The kinetics of dissolution of Ag in cyanide solutions under O_2 pressure were investigated over a wide range of conditions establishing reactions involved and factors which influence the rate. Thermodynamic features of the reaction with particular reference to the influence of pH and CN. Graphs. 19 ref. (P12, Ag)

474-P. Electrical Resistivity of Liquid Metals and of Dilute Liquid Metallic Solutions. E. Scala and W. D. Robertson. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1141-1147.

Electrical resistivity of some pure liquid metals and alloys measured as a function of temperature and composition. Data show close correspondence between liquid and solid states with respect to thermal, structural and compositional relationships. Diagrams, graphs. 15 ref. (P15)

475-P. Thermal Conductivity, Electrical Resistivity, and Thermoelectric Power of Uranium. W. W. Tyler, A. C. Wilson, Jr., and G. J. Wolga. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1238-1239.

Experimental results. (P11, P15, U)

476-P. Resistance-Independent Absorption of Light Waves by Metals, and the Properties of Ideal Conductors. J. Lindhard. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 916-919.

Theory of optical properties of metals developed by Zener and Kronig. (P17)

477-P. Neutralization of Ions and Ionization of Atoms Near Metal Surfaces. L. J. Varnerin, Jr. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 859-863.

Conditions for the resonance transfer of an electron between a metal and an ion or atom in close proximity to the surface. Graphs, diagram. 6 ref. (P15)

478-P. Excitation Functions for Proton-Induced Reactions With Copper. J. W. Meadows. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 885-889.

Method to study cross section for formation of various isotopes of Cu and Zn as a function of energy. Graphs, tables. 13 ref. (P13, Cu, Zn)

479-P. The Electronic and Lattice Specific Heats in W, Mo, and Re. M. Horowitz and J. G. Daunt. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1099-1106.

Calorimetric measurements made in temperature range 1 to 77° K. Tables, graphs. 44 ref. (P12, W, Mo, Re)

480-P. Radiation Characteristics of Metals. Joseph Poggie. *Product Engineering,* v. 24, Sept. 1953, p. 205, 207.

Relative effects of surface texture and composition on emissivity of various metals at elevated temperature. Graphs. (P17)

481-P. Theoretical Resistivity and Hall Coefficient of Impure Germanium Near Room Temperature. P. G. Herkart and J. Kurshan. *RCA Review,* v. 14, Sept. 1953, p. 427-440.

Calculated values to aid in determining impurity contents of unknown samples. Graphs. (P15, Ge)

482-P. The Thermal Expansion of Anisotropic Metals. B. G. Childs. *Reviews of Modern Physics,* v. 25, July 1953, p. 665-670.

Variation with temperature of thermal expansion of anistropic metals. Theoretical significance of experimental data. Graphs, table. 36 ref. (P11)

483-P. The Spontaneous Magnetization of Alloys. I. Copper Nickel Alloys. D. J. Oliver and W. Sucksmith. *Royal Society, Proceedings,* v. 219, ser. A, Aug. 11, 1953, p. 1-17.

Initial stage of a project to determine temperature variation of spontaneous magnetization for a number of ferromagnetics. Graphs. 20 ref. (P16, Cu, Ni)

484-P. (French.) **Metallic Dysprosium and Its Magnetic Properties.** F. Trombe. *Journal des recherches du centre national de la recherche scientifique,* 1953, no. 23, June, p. 61-69.

Physical properties of rare-earth metals in general. Paramagnetic and ferromagnetic properties of Dy vary with temperature. Diagrams, graphs. 31 ref. (P16, Dy, EG-g)

485-P. (French.) **Irregular Expansion of the Rare Earth Ferromagnetic Metals Gadolinium and Dysprosium.** F. Trombe and M. Foex. *Journal des recherches du centre national de la recherche scientifique,* 1953, no. 23, June, p. 71-75.

Behavior of Gd and Dy at and above the Curie point. Graphs. 13 ref. (P16, Gd, Dy)

486-P. (German.) **Coercive Force of Magnets Pressed From Ultrafine Iron-Cobalt Powder.** F. Lihl. *Acta Physica Austriaca,* v. 7, no. 3, July 1953, p. 239-247.

Dependence of coercive force, residual magnetism and magnetizing force on Co content of magnets produced by reducing Fe compounds. Earlier data confirmed. Graphs, tables. 6 ref. (P16, H10, Co, Fe)

487-P. (German.) **Vapor Pressure of Liquid Titanium Tetrachloride.** Harald Schafer and Friedrich Zeppernick. *Zeitschrift für anorganische und allgemeine Chemie,* v. 272, nos. 5-6, July 1953, p. 274-278.

Static measurements of pressure and boiling point. Tables, graph, diagram. 4 ref. (P12, Ti)

488-P. (German.) **Chemical Properties of Gold.** Ernst Raub and Annemarie Engel. *Zeitschrift für Metallkunde,* v. 44, no. 7, July 1953, p. 298-301.

Reactions of gold alloys with S, S compounds and H_2O_2-containing NaCl solution. Graphs. 2 ref. (P13, Au)

489-P. Aluminium and Alloys. Properties of Materials. F. R. Barnett. *Australasian Engineer,* 1953, Feb., p. 58-65.

Mechanical, physical, and corrosion properties. Tables, photographs, graphs. (P general, Q general, R general, Al)

490-P. The Anodic Behaviour of Copper in Neutral and Alkaline Chloride Solutions. H. Lal and H. R. Thirsk. *Chemical Society, Journal,* 1953, Sept., p. 2638-2644.

Conditions under which the metal passes into solution, nature of oxide or salt deposited on anode, and effect of increasing alkalinity. Graphs. (P13, Cu)

491-P. On the Thermal Conversion of Germanium. F. van der Maesen, P. Penning, and A. van Wieringen. *Philips Research Reports,* v. 8, Aug. 1953, p. 241-244.

Experiments on conversion of *n*-type Ge into *p*-type by heat treatment at 800° C. Photographs. 6 ref. (P15, Ge)

492-P. Photoelectromagnetic and Photodiffusion Effects in Germanium. T. S. Moss, L. Pincherle, and A. M. Woodward. *Physical Society, Proceedings,* v. 66, no. 405B, Sept. 1953, p. 743-752.

Experimental data. Graphs. 7 ref. (P16, Ge)

493-P. Thermal Conductivity of Silver at Low Temperatures. G. K. White. *Physical Society, Proceedings,* v. 66, no. 405A, Sept. 1953, p. 844-845.

Tests were made between 2 and 160° K. Graphs. 5 ref. (P11, Ag)

494-P. Thermo-Electricity at Low Temperatures. I. The 'Ideal' Metals: Sodium, Potassium, Copper. D. K. C. MacDonald and W. B. Pearson. *Royal Society, Proceedings,* v. 219, ser. A, Sept. 22, 1953, p. 373-387.

Electron theory of metals. Experimental data. Diagrams, graphs, table. 33 ref. (P15, Na, K, Cu)

495-P. (French.) **Measuring the Variation of Free Energy of a Metal During Cold-Hardening.** Roger Jouty.

Comptes rendus, v. 237, no. 9, Aug. 31, 1953, p. 488-489.

Electrochemical method. Experimental details. (P12)

496-P. (German.) **Thermal Effects of Metallurgical Reactions.** Carl V. Schwarz. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 7-8, July-Aug. 1953, p. 285-306.

Heats of formation of 644 compounds encountered in metallurgical processes. Tables. 7 ref. (P12)

497-P. (Russian.) **Dependence of Compressibility of Elements on the Atomic Number.** L. F. Vereshchagin and A. I. Likhter. *Doklady Akademii Nauk SSSR*, v. 86, new ser. no. 4, Oct. 1, 1952, p. 745-747.

Graphs for compressibility of nearly all elements at 1 atm., 30,000 kg. per $cm.^2$, and 10,000 kg. per $cm.^2$. (P10)

498-P. Growth Characteristics of Ingot-Mould Irons in Air and Vacuum. J. W. Grant. *Institute of British Foundrymen, Paper no.* 1063, 1953, 19 p.

Theories of growth of cast iron. Air annealing halted growth due to repeated heating in vacuum. Graphs, micrographs, tables. 24 ref. (P10, J23, CI)

499-P. Brillouin Zone Investigation of Mg Alloys. I. Hall Effect and Conductivity. A. I. Schindler and E. I. Salkovitz. *Physical Review*, v. 91, ser. 2, Sept. 15, 1953, p. 1320-1322.

Familiar conductivity rules for alloys in the light of Jones theory. Deviations from these rules to be expected for alloys of divalent hexagonal metals. Diagrams, graphs. 6 ref. (P15, Mg, Al, Ag)

500-P. Absorption of Infrared Light by Free Carriers in Germanium. H. B. Briggs and R. C. Fletcher. *Physical Review*, v. 91, ser. 2, Sept. 15, 1953, p. 1342-1346.

Measurements of above by injecting these carriers across *p-n* junction at room temperature. Diagrams, graphs. 13 ref. (P15, Ge)

501-P. The Atomic Heat of Germanium Below 4° K. P. H. Keesom and N. Pearlman. *Physical Review*, v. 91, ser. 2, Sept. 15, 1953, p. 1347-1353.

Measurements with pure polycrystalline and single crystal ingots, indium and antimony doped single crystal ingots, and pure crushed material. Diagram, tables, graph. 26 ref. (P12, Ge)

502-P. The Hall Effect in Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Gadolinum, Dysprosium, and Erbium. C. J. Kevane, S. Legvold and F. H. Spedding. *Physical Review*, v. 91, ser. 2, Sept. 15, 1953, p. 1372-1379.

Tables, diagrams, graphs. 24 ref. (P15, Y, La, Ce, Pr, Nd, Gd, Dy, Er)

503-P. (German.) **Thermal Stressing of Tellurium Metal (Research on Suitability of Tellurium-Metallic Compositions for Thermo-Elements of Low Inactivity).** G. C. Mönch. *Annalen der Physik*, v. 12, nos. 4-6, July 1953, p. 161-174.

Results of measurements of sensitivity, time constants, and vacuum factor in thermo-elements of various Te alloys. Destructive diffusion of Ag in Te. Diagrams, tables. 2 ref. (P15, N1, Te, Ag)

504-P. (German.) **Thermal Stressing Tellurium-Silver (Research on Peculiarities of Tellurium-Silver Thermo-Elements).** Th. Mohr. *Annalen der Physik*, v. 12, nos. 4-6, July 1953, p. 175-182.

Infusion of Ag into Te causes lowering of resistance and formation of additional, secondary, movable soldering point. Lattice processes in pure Te effected a rise of resistance in the elements. Diagrams, tables. 3 ref. (P15, N11, Te, Ag)

505-P. (German.) **Decomposition of Mg^{27}.** H. Daniel. L. Koester and T. Mayer-Kuckuk. *Zeitschrift für Naturforschung*, v. 8a, no. 7, July 1953, p. 447-448.

Three methods of investigation by measuring emission of beta and gamma rays. 10 ref. (P13, Mg)

506-P. (German.) **Electrical Properties of InSb.** H. Weiss. *Zeitschrift für Naturforschung*, v. 8a, no. 8, Aug. 1953, p. 463-469.

Measurements of conductivity, Hall effect and magnetic resistance change. Graphs, diagrams. 8 ref. (P15, In, Sb)

507-P. Semiconducting Intermetallic Compounds. *National Bureau of Standards, Technical News Bulletin*, v. 37, Nov. 1953, p. 174-175.

Recent work on Hall effect and conductivity in GaSb, AlSb, CdSb and InSb. Photographs. (P15, Ga, Sb, Al, Cd, In)

508-P. The Energy Band Structure of a Linear Metal. E. P. Wohlfarth. *Physical Society, Proceedings*, v. 66, no. 406A, Oct. 1953, p. 889-893.

A tight binding calculation of the one-electron energy as a function of wave number for a linear chain of hydrogen atoms in the ground state. 12 ref. (P10)

509-P. (English.) **The Low Temperature of Specific Heat of Antimony.** W. DeSorbo. *Acta Metallurgica*, v. 1, no. 5, Sept. 1953, p. 503-507.

Measurements were made from 13 to 70° K. Data compared to calculated values. Tables, graphs. 16 ref. (P12, Sb)

510-P. (English.) **Relation Between Plastic Strain and Increase of Electrical Resistivity of Metals.** H. G. van Bueren. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 607-609.

Experimental data indicate that vacancies and interstitial atoms are more effective than dislocations in causing increased resistivity of copper, silver and gold. 6 ref. (P15, Q24, Cu, Ag, Au)

511-P. (Russian.) **Measurement of the Melting Point of Metals at Superhigh Pressures.** V. P. Butuzov, M. G. Gonikberg, and S. P. Simrnov. *Doklady Akademii Nauk SSSR,* v. 89, no. 4, Apr. 1953, p. 651-653.

Methods for measuring temperatures higher than 200° C. Diagram, graph, table. 6 ref. (P12)

512-P. (Book.) **Reports on Progress in Physics. V. XV.** A. C. Strickland, editor. 338 p. 1952. Physical Society, Lowther Gardens, Prince Consort Road, London S.W. 7, England.

Includes "The Hydrogen Bond", L. Kellner; "Mass Spectrometry", K. I. Mayne; "Range Energy Relations", A. E. Taylor; "The Analysis of High Energy Neutron-Proton and Proton-Proton Scattering Data", R. S. Christian; "Turbulent Motion", G. K. Batchelor; "Ferrites", A. Fairweather, F. F. Roberts, A. J. E. Welch; "The Band Structure of Metals", G. V. Raynor; "Galvanomagnetic Effects in Conductors", D. K. C. Mac Donald and K. Sarginson; and "Traveling Wave Tubes", R. Kompfner. (P general, M27)

513-P. (Book.) **Survey Characteristics, and Evaluation of High-Performance Magnetic Core Materials.** Wright Air Development Center, U.S.A.F. 1952. 44 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

Reports survey of several high-performance magnetic core materials as an aid in evaluating and comparing materials possessing wide frequency and flux density ranges, but differing greatly in other characteristics. (P16)

SECTION Q

MECHANICAL PROPERTIES and TEST METHODS; DEFORMATION

1-Q. The Behaviour of Beams in Bending. S. S. Gill. *Aircraft Engineering,* v. 24, Nov. 1952, p. 336-343.

Experiments carried out on beams in pure bending using cast Mg alloy AZ855. Beam sections were rectangular, circular, I-section, T-section, and diamond. One series of tests was carried out up to 1½% fiber strain, and a second series up to fracture. Tension and compression tests were also made. Diagrams, photographs, and graphs. 11 ref. (Q5, Mg)

2-Q. The Saunders-Roe Technograph Foil Strain Gauge. A New Type of Gauge Which May Solve Many Problems. *Aircraft Engineering,* v. 24, Nov. 1952, p. 348.

It is claimed that these gages are more satisfactory for dynamic tests than wire strain gages. (Q25)

3-Q. Bending Strength of Corrugated Plate. J. B. Caldwell. *Engineering,* v. 174, Nov. 7, 1952, p. 609-612.

Reviews previous investigations, and discusses more fully some features of the behavior of steel and Al alloy corrugated sheets under bending conditions. Only straight-line troughs of trapezoidal or triangular form are considered. Diagrams and graphs. (Q5, CN, Al)

4-Q. Aid for the High-Temperature Designer. James Miller. *General Electric Review,* v. 55, Nov. 1952, p. 51-53.

How rupture characteristics of a metal can be graphically represented in a single curve. (Q4, Sg-h)

5-Q. Hot-Cold Work Improves 16-25-6 Properties. M. Fleischmann. *Iron Age,* v. 170, Nov. 20, 1952, p. 123-127.

Jet engines offer a wider field for application of the 16-25-6 Cr-Ni-Mo alloy steel developed during World War II for gas turbines and turbo superchargers. Creep tests at 10,000 hr. and above were conducted with varying heat treatments including water quenching, hot rolling, and hot-cold working. Graphs, diagrams, and micrographs. (Q3, J general, AY, SS)

6-Q. Stress-Rupture Characteristics of Unalloyed Titanium Plotted. F. B. Cuff, Jr., and N. J. Grant. *Iron Age,* v. 170, Nov. 20, 1952, p. 134-139.

Describes tests. Tables, graphs, and micrographs. (Q4, Ti)

7-Q. Fatigue Life of Wing Components for Civil Aircraft. Keri Williams. *Journal of the Royal Aeronautical Society,* v. 56, Nov. 1952, p. 842-848.

Three phases of investigation include fatigue tests, load frequencies, and correlation of test results and load frequencies. (Q7)

8-Q. Plastic Deformation of Germanium and Silicon. C. J. Gallagher. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 721-722.

Single crystals of Ge and Si were plastically deformed at elevated temperatures. Ge becomes ductile above 500° C., and Si requires a temperature above 900° C. At temperatures below 600° C., Ge exhibits an induction period at constant load. Graph and micrographs. (Q23, Ge, Si)

9-Q. The Plasticity of Silicon and Germanium. Frederick Seitz. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 722-724.

Qualitative analysis of Gallagher's measurements of plasticity. Analogy between Gallagher's measurement and those of Kramer and Maddin on β-brass. (Q23, Si, Ge)

10-Q. Anelastic Measurements of Atomic Mobility in Substitutional Solid Solutions. A. S. Nowick. *Physical Review,* ser. 2, v. 88, Nov. 15, 1952, p. 925-934.

A recently developed method for obtaining atomic mobility in solid

solutions from rate of anelastic relaxation makes possible measurement of mobilities at temperatures far below those at which conventional diffusion experiments can be carried out. Shows that anelastic effects obtained in substitutional solid solutions are due to stress-induced ordering and that relaxation rate is determined primarily by rate of movement of slower atomic species. Method was applied to Ag-rich Zn solid solutions and relaxation time measured as a function of temperature and concentration. Graphs. 27 ref. (Q22, Ag)

11-Q. The Effect of Grip on the Fatigue Strength of Riveted and Bolted Joints. Frank Baron and Edward W. Larson, Jr. *American Railway Engineering Association Bulletin,* v. 54, Sept.-Oct. 1952, p. 175-190.

Effect of clamping force, degree of hole-filling, and length of grip on the fatigue strength of riveted steel joints. Tables and graphs. (Q7, K13, CN)

12-Q. The Ductility of Metals in Creep-Rupture Tests. H. H. Bleakney. *Canadian Journal of Technology,* v. 30, Dec. 1952, p. 340-351.

Evidence to show that impurities in commercially pure metals are most common cause of brittle intercrystalline cracking which is characteristic of such materials in creep-rupture tests. Results of tests on Cu, Al, and Ag, and work on Pb and Fe, indicate decreased embrittlement, in creep-rupture tests, with increasing purity of metal. Graphs and tables. 14 ref. (Q3, Cu, Al, Ag, Pb, Fe)

13-Q. How Much Combined Stress Can a Rivet Take? T. R. Higgins and W. H. Munse. *Engineering News-Record,* v. 149, Dec. 4, 1952, p. 40-42.

Tests on steel rivets. Graphs and tables. (Q23, K13, ST)

14-Q. The Ferrometer, an Apparatus for Testing the Quality of Steel. I. Svensson. *Engineers' Digest,* v. 13, Nov. 1952, p. 393-394, 398. (Translated and condensed from *Ericsson Review,* no. 2, 1952, p. 49-53.)

Application to hardness determination, tempering, conversion of martensite and residual austenite, fault detection, and mechanical load tests. (Q29, Q27, S13, ST)

15-Q. Creep of Copper Under Deuteron Bombardment. Warren F. Witzig. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1263-1266.

Investigation using the 16-Mev. external beam of the University of Pittsburgh cyclotron. Measurements were made of 2nd-stage creep rate of a Cu wire under deuteron bombardment at 260° C. and a loading of 10,000 psi. Tables and graphs. (Q3, P10, Cu)

16-Q. Structural Behavior in Ships at Sea. E. A. Wright and John Vasta. *Journal of the American Society of Naval Engineers,* v. 64, Nov. 1952, p. 693-706.

Reviews past efforts at observations of ship structures and draws tentative conclusions from data presently available. Elements of the problem, development of instrumentation, observations at sea, and future work. Graphs, diagrams, and photographs. 20 ref. (Q23, CN)

17-Q. On the Foot-Hills of the Plastic Range. H. W. Swift. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 109-120.

Present state of knowledge and the extent research is able to make its contribution to various technological processes involving plastic deformation. Suggests the most profitable directions of inquiry appropriate to mathematicians, metal physicists, and engineers. An appeal is made to the metal physicist for a more realistic model of lattice structure, and for a systematic study of stress-strain relations on a wider front than heretofore. Diagrams and graphs. (Q24)

18-Q. The Embrittlement of Copper-Antimony Alloys at Low Temperatures. D. McLean. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 121-123.

Results of V-notch Charpy tests carried out from +100 to −253° C. on slowly cooled Cu alloys containing up to 1.3% Sb. (Q23, Cu)

19-Q. Crystal Slip in Aluminium During Creep. D. McLean. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 133-144.

A study was made of types of slip bands formed in pure polycrystalline Al undergoing creep at 200° C. Two types of slip bands were observed: prominent slip bands of about ¾ μ displacement spaced about 30 μ apart, and fine slips lines of about 50-500 A displacement and spaced less than 1 μ apart which filled interspaces between the former. Results are discussed in terms of dislocation theory. Data are charted. 18 ref. (Q3, Q24, Al)

20-Q. Plastic Deformation of Coarse-Grained Aluminium. V. M. Urie and H. L. Wain. *Journal of the Institute of Metals,* v. 81, Nov. 1952, p. 153-159.

A fine grid, photographically reproduced on the specimen surface, was used to measure local elongations in individual grains of coarse-

grained Al. Data are charted. 19 ref. (Q24, Al)

21-Q. Stress-Rupture and Creep Testing of Brittle Materials. W. A. Maxwell and Paul F. Sikora. *Metal Progress,* v. 62, Nov. 1952, p. 97-99.

A convenient method for stress-rupture tests of brittle materials. Inconel "X" was used for grips. Limitations and advantages. (Q3, Q4, T5, Ni)

22-Q. Titanium Sticks to Indenter. H. P. Leighly, Jr. and H. L. Walker. *Metal Progress,* v. 62, Nov. 1952, p. 109.

Difficulty of making hardness tests of Ti. (Q29, Ti)

23-Q. The Influence of Aluminium and of Various Heat Treatments on the Creep Properties of Low Carbon Steel Superheater Tubes. D. C. Herbert and E. A. Jenkinson. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 69, Nov. 1952, p. 27-44.

Creep properties of three low-carbon steels having 1, 2, and 3 lb. per ton of added Al respectively were determined in creep tests at 8 tons per sq. in. and 450° C. Tests were made on samples of tubes at various stages of manufacture, and after further reduction, either hot or cold. Some samples were subjected to one of various commercial annealing treatments before testing. Tables, graphs, and photomicrographs. (Q3, CN)

24-Q. A Theory of Work-Hardening of Metal Crystals. N. F. Mott. *Philosophical Magazine,* ser. 7, v. 43, Nov. 1952, p. 1151-1178.

Theory based on properties of dislocations. Diagrams. 41 ref. (Q24)

25-Q. Critical Shear Stress and Temperature. E. N. Da C. Andrade. *Philosophical Magazine,* ser. 7, v. 43, Nov. 1952, p. 1218-1221.

Considers above with reference to Bi, Zn, Cd, Cu, Mg, Ag, Au, Pb, and Hg. Graphs. 12 ref. (Q2)

26-Q. Strand Wire Ropes *Wire Industry,* v. 19, Nov. 1952, p. 1030, 1033.

Factors which influence the life of a rope, including effects of bending, size of pulleys and drums, and wear distribution. (Q9, ST)

27-Q. (French.) **Application of the Principle of Increasing the Yield Point of Steels by Cold Working and Artificial Aging to the Design of Reinforced Conduits; Resulting Economic Advantages.** Georges Ferrand. *Berg- und Hüttenmännische Monatshefte der Montanistischen Hochschule in Loeben,* v. 97, Oct. 1952, p. 192-201.

Tabulated data show that cold working followed by artificial aging increases the strength properties of steels. Diagrams and photographs. (Q23, Q24, ST)

28-Q. (French.) **The Resistance to Heat of Light Alloys.** Jacques Valeur. *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 339-346. (Based on paper by Raymond Chevigny and Robert Syre.)

Mechanical properties of light alloys at temperatures from 480 to 575° F. Influence of composition, conditions of production of the metal, grain size, duration of preheating, heat treatments, loading conditions, and galvanic coatings were studied. Tables. (Q general, N3, J general, L16, Al, Mg)

29-Q (German.) **Properties of Soft Steels Blown With Oxygen-Steam Mixtures.** Alfred Krüger. *Stahl und Eisen,* v. 72, Nov. 6, 1952, p. 1426-1433.

Statistical analysis of C, Mn, P, S, and N_2 contents of 109 steels having poor N_2 contents, refined in a 2-ton converter with O_2 and steam in varying proportions. Effects of notched bar impact strength after aging, tensile strength, cold deformation, and deep drawing tests of sheets. Metallographic examination. Graphs. 19 ref. (Q23, Q6, D2, ST)

30-Q. (German.) **Investigations on the Replacement of Alloy Metals by Boron in Case Hardening and Heat Treating Steels.** Robert Scherer, Karl Bungardt, and Ernst Kunze. *Stahl und Eisen,* v. 72, Nov. 6, 1952, p. 1433-1442.

Tests with Cr-Mn and Cr-Ni steels of the case hardening type to determine effect of boron on hardness penetration and notched-bar impact strength of disks; and heat treating tests on Mn-Si, Cr-Mo, and Cr-Va steels with and without boron, to determine properties after quenching and tempering at different temperatures. Tables and graphs. (Q29, Q6, J28, AY)

31-Q. (Russian.) **Tensile Fracture During Compression of Brittle Quasi-Isotropic Polycrystals.** S. D. Volkov. *Doklady Akademii Nauk SSSR,* v. 85, Aug. 11, 1952, p. 967-970.

Theoretical proof. Includes diagrams. (Q28)

32-Q. (Russian.) **Microhardness of Borides and Nitrides of Refractory Metals.** G. V. Samsonov. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 329-332.

Borides of Ti, Zr, V, Cb, Ta, Cr, and W, and nitrides of Ti, Zr, and Ta were investigated. Data are tabulated and discussed. (Q29)

33-Q. (Russian.) **The Problem of Wear Resistance of Diffused Chromium Coatings.** N. S. Gorbunov and V. P. Lazarev. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 11, 1952, p. 345-347.

The wear resistance and microhardness of hot-chromized iron specimens were studied. Wear testing

apparatus. Data are tabulated and charted. (Q9, Q29, Fe, Cr)

34-Q. Flexural Fatigue Strength of Anodized 24-ST Aluminum-Alloy Sheet. Charles B. Cliett. *Aeronautical Engineering Review,* v. 11, Dec. 1952, p. 29-30, 42.

Results of investigation. Conclusion is drawn that anodizing reduces life of Al alloy when subjected to fatigue conditions and to combined action of corrosion and fatigue. Graphs and diagrams. (Q7, R1, L19, Al)

35-Q. High Temperature Alloys for Gas Turbines. H. V. Kinsey. *Canadian Metals,* v. 15, Oct. 1952, p. 28, 30.

Reviews requirements and tabulates information on tensile strength and on creep and rupture properties at elevated temperatures. (To be concluded.) (Q27, Q3, T25, SG-b)

36-Q. Mechanism of Work-Hardening of Metals. N. F. Mott. *Engineer,* v. 194, Nov. 21, 1952, p. 694-697.

The origin of slip lines, reason for clustering and cause of work hardening. Two conceptions used in discussion are dislocation line and vacant lattice site. (Q24)

37-Q. Stress and Plastic Strain Relations of a Magnesium Alloy. A. E. Johnson and N. E. Frost. *Engineer,* v. 194, Nov. 28, 1952, p. 713-719.

Tests made under complex stress systems on a nominally isotropic Mg alloy at temperatures between 20 and 150° C. Graphs. (Q25, Mg)

38-Q. High Temperature Metals. Albert E. White. *Industrial Heating,* v. 19, Oct. 1952, p. 1862-1864, 1866, 1870.

Determination of mechanical properties, operating temperatures and pressures of various metals and alloys, particularly Cr-Mo steel for use at elevated temperatures in power, petroleum, automotive, and aviation industries. Graphs. (To be continued. (Q general, AY, SG-h)

39-Q. Scabbing of Metals Under Explosive Attack: Multiple Scabbing. John S. Rinehart. *Journal of Applied Physics,* v. 23, Nov. 1952, p. 1229-1233.

Mechanics of the generation of multiple scales. Experimentally obtained stress data are used as basis for discussion. Graphs, diagrams, and photographs. (Q25)

40-Q. Cast Iron With the Properties of Steel. *Railway Mechanical and Electrical Engineer,* v. 126, Dec. 1952, p. 68-69.

A ductile cast iron, developed by International Nickel Co., in which Mg is used to spheroidize the carbon. Mechanical properties are charted. (Q general, CI)

41-Q. (German.) **The Shape Retention of Structural Parts.** Cord Petersen. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Oct. 21, 1952, p. 977-982.

Theoretical discussion and review of literature advances the idea that it should be possible to find a substitute bar for every structural part whose alternating fatigue strength is the same as that for a structural part and which can be used to compute the strength properties of similar structural parts of different size and different steels. Tables, graphs, and diagrams. 18 ref. (Q7, ST)

42-Q. (Italian.) **Advantages of the "Tukon" Microhardness Tester in Metallography.** D. Gualandi. *Alluminio,* v. 21, Nov. 1952, p. 463-471.

The real nature of hardness and the principle and use of the Tukon tester. Micrographs, photographs, and diagrams. 11 ref. (Q29, M23)

43-Q. (Italian.) **Experimental and Theoretical Investigations on Al-Mg-Si Alloy for 24 Liter Capacity Liquid Gas Cylinders.** F. Gatto. *Alluminio,* v. 21, Nov. 1952, p. 481-503.

Results of deformation and explosion tests of 30 cylinders made of the above alloys. Tables, photographs, diagrams, and charts. 16 ref. (Q23, Al)

44-Q. (Book.) **Elasticity in Engineering.** Ernest E. Sechler. 419 pages. 1952. John Wiley & Sons, 440 Fourth Ave., New York 16. $8.50.

Fundamental equations and assumptions underlying the field of elasticity; and elastic problems of stable structures. Shows where exact solutions are possible and deals with similar problems of unstable elastic structures. (Q21)

45-Q. (Book.) **Fatigue and Fracture of Metals.** 313 pages. 1952. William M. Murray, editor. Technology Press, Massachusetts Institute of Technology; and John Wiley and Sons, 440 Fourth Ave., New York 16, N. Y. $6.00.

Includes 14 papers given at a conference at MIT in June 1950. Topics covered are: general experiences with metal failures; specific fields of occurrence; probable internal mechanisms of fatigue; metallurgical fatigue phenomena; and research. (Q7, Q26)

46-Q. (Book.) **Weight-Strength Analysis of Aircraft Structures.** F. R. Shanley. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $8.50.

Basic methods for determining minimum weight values for aircraft, and proper application of these values. Concludes with a number of special reports on weight considerations for new materials and extreme operating conditions. (Q23, T24)

47-Q. Cast Iron That Bends. *Diesel Power and Diesel Transportation,* v. 30, Dec. 1952, p. 60-61, 87.

Development and composition of ductile iron. Characteristics of castability, tensile properties, wear resistance, fatigue resistance, and resistance to shock loads. (Q general, CI)

48-Q. Micro Indentation-Hardness, A New Definition. P. Grodzinski. *Industrial Diamond Review,* new ser., v. 12, Oct. 1952, p. 209-218; Nov. 1952, p. 235-238.

See abstract of German version in *Schweizer Archiv für angewandte Wissenschaft und Technik,* item 1065-Q, 1952. (Q29)

49-Q. Plastic Instability Under Plane Stress. H. W. Swift. *Journal of the Mechanics and Physics of Solids.* v. 1, Oct. 1952, p. 1-18.

Examines conditions for instability of plastic strain under plane stress for materials conforming to the Mises-Hencky yield condition and strain hardening according to a unique relationship between root-mean-square values of shear stress (q) and incremental strain ($\delta\psi$) and certain cases of nonuniform stress distribution. Data are tabulated and charted. (Q23)

50-Q. On Discontinuous Plastic States, With Special Reference to Localized Necking in Thin Sheets. R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, Oct. 1952, p. 19-30.

Theoretical discussion of localized necking of a sheet deformed in its plane. Results are illustrated by modes of necking in tensile specimens. 13 ref. (Q27)

51-Q. Rheology of Metals at Elevated Temperatures. A. E. Johnson and N. E. Frost. *Journal of the Mechanics and Physics of Solids,* v. 1, Oct. 1952, p. 37-52.

General stress, time, and temperature dependence of creep, plastic strain, and relaxation properties of several metals and alloys involving simple tensile, torsion, and combined stress-creep tests, and similar varieties of short period plastic strain tests and relaxation tests. Tables and charts. 14 ref. (Q24, Q3)

52-Q. The Time Laws of Creep. A. H. Cottrell. *Journal of the Mechanics and Physics of Solids,* v. 1, Oct. 1952, p. 53-63.

Attempts are made to explain and correlate various theories and experimental observations on creep of metals. 21 ref. (Q3)

53-Q. The Yield Phenomenon In Polycrystalline Mild Steel. W. M. Lomer. *Journal of the Mechanics and Physics of Solids,* v. 1, Oct. 1952, p. 64-73.

Attempts to summarize and interrelate the important macroscopic features of yield in polycrystalline iron. 24 ref. (Q23)

54-Q. The Structural Behaviour of the Main Engine Seatings and Bedplate in a Cargo Ship Under Static Bending Tests. A. J. Johnson and J. E. Richards. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 69, Pt. 2, Dec. 1952, p. 45-90.

Investigation of flexure of bedplate and seatings of the triple-expansion steam engine of a standard type 10,000-ton dry-cargo ship while subject to static bending tests. Details of the instrumentation and testing technique used. Diagrams, graphs, photographs, and tables. (Q5, CN)

55-Q. Accommodation Kinking Associated With the Twinning of Zinc. A. J. W. Moore. *Proceedings of the Physical Society,* sec. B, v. 65, Dec. 1, 1952, p. 956-958.

Small changes of slope on cleavage surfaces of Zn single crystals were measured by a stylus-type profile recorder (Talysurf) and compared with photomicrographs of same areas. Diagrams. (Q24, Zn)

56-Q. Initiation and Propagation of Brittle Fracture in Structural Steels. Peter P. Puzak, Earl W. Eschbacher, and William S. Pellini. *Welding Journal,* v. 31, Dec. 1952, p. 561s-581s.

Tests correlated with ship fracture data indicate that structural steels of the ship-plate type develop brittle fracture in the range of service temperatures when loaded in the presence of a sharp cleavage crank defect. Graphs, diagrams, and photographs. (Q26, ST)

57-Q. Effect of Stresses on Strength of Circumferentially Welded Cylinders. L. J. Privoznik. *Welding Journal,* v. 31, Dec. 1952, p. 587s-595s.

Investigation showed that under high internal pressures, in steel cylinders in which the parent metal was of equivalent strength to the weld metal, the circumferential band of weld metal in as-weld cylinders increased the bursting strength to a greater degree than did weld metal in stress-relieved cylinders. Graphs and photographs. (Q23, Q25, J1, ST)

58-Q. Factors Which Determine the Performance of Aluminum Alloy Weldments. W. R. Apblett, Jr., C. R. Felmley, and W. S. Pellini. *Welding Journal,* v. 31, Dec. 1952, p. 596s-606s.

The explosion bulge test was utilized to establish the factors which

determine the performance of Al alloy weldments. Two types of alloys were investigated; the common heat treatable alloys (61S and 24S) and the solid solution hardening type containing Mg as the primary alloying element. Deformation characteristics of the various weld and base metal combinations were determined by means of photogrids applied to the surface of the specimens. Tables and graphs. (Q23, Q25, Al)

59-Q. Column Strength Under Combined Bending and Thrust, Progress Report No. 6 on Welded Continuous Frames and Their Components. Robert L. Ketter, Lynn S. Beedle, and B. G. Johnston. *Welding Journal,* v. 31, Dec. 1952, p. 607s-622s.

Results of an analytical and experimental study to determine the strength of columns subjected to various combinations of axial load and end bending moment and to determine the behavior of such columns in the elastic and inelastic ranges. Collapse solution based on the "simple plastic" theory is also included together with an approximate buckling solution based on the work by Jezek. Graphs. 21 ref. (Q5, Q28)

60-Q. (Russian.) Corrugations on the Surface of Certain Machine Parts. Ia. L. Nudel'man and L. B. Erlikh. *Doklady Akademii Nauk SSSR,* v. 85, Aug. 11, 1952, p. 971-974.

Causes were determined experimentally and were analyzed using the elastic theory. (Q9, Q25, ST)

61-Q. The Mechanical Properties of Iron and Some Iron Alloys of High Purity. W. P. Rees. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 506-534.

Influence of C and Mn on transition temperature of Fe was studied by means of impact tests. Data are tabulated and charted. (Q6, Fe)

62-Q. Effect of Hydrogen on the Deformation and Fracture of Iron and Steel in Simple Tension. Paul Bastien and Pierre Azou. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 535-552.

A detailed study. Segregation of H_2 at dislocations and imperfections appeared to be cause of brittleness. Tables and diagrams. 16 ref. (Q27, Q23, CN)

63-Q. Elimination of Yield Point Phenomena by Temper Rolling and Roller Levelling. N. H. Polakowski. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 553-571.

Reviews laboratory and commercial methods of eliminating the yield point. Causes are explained. 17 ref. (Q23, F23, CN)

64-Q. Mechanical Properties of Spring Steel. T. Mitsuhasi, M. Ueno, R. Nakagawa, and K. Tsuya. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 572-579.

Tensile properties, endurance limit, and damping capacity of spring steel as martempered, austempered, oil quenched and tempered. Spring properties of spheroidized steel are reported in terms of particle size. Satisfactory properties can be obtained only with particles less than a critical size. (Q general, SG-b, CN)

65-Q. The Plastic Deformation of Zinc Bicrystals. Tomoyoshi Kawada. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 591-602.

Stress-strain curves and cross-sectional shapes of zinc bicrystals after deformations are rationalized in simple terms. Tables, charts, photographs, and diagrams. (Q24, Zn)

66-Q. The Influence of Different Surface Coatings on the Fatigue Strength of Steel. Otto Forsman and Evert Lundin. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 606-612.

Tests were made on several steels with Zn, Sn, Cd, Ni, and Cr coatings in air, tap water, and 3% salt solution. (Q7, R4, ST)

67-Q. Some Factors Affecting the Wear of Bronze. S. G. Daniel and R. Graham. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 613-631.

Factors influencing wear rate were studied on gears and special test bars. Data are tabulated and charted. (Q9, Cu)

68-Q. A Comparison Between Fe-Cr-Al and Ni-Cr Alloys for High Temperature Service. Gösta Hildebrand. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 632-636.

Mechanical and physical properties are compared so as to establish fields of application for each. (Q general, P general, SG-h)

69-Q. Rheotropic Embrittlement. E. J. Ripling. *ASTM Bulletin,* Dec. 1952, p. 37-42; disc., p. 42.

Mathematical analysis which considers rheotropic behavior of steel and Zn. Effect of testing temperature, prestraining method, and effect at constant straining temperature. Graphs. (Q24, ST, Zn)

70-Q. A Statistical Analysis of the Mechanical Properties of Cast and Wrought Gold Dental Alloys. S. H. Bush. *ASTM Bulletin,* Oct. 1952, p. 46-50.

Linear correlations for proportional limit and tensile strength, proportional limit and Brinell hardness number, and tensile strength and Brinell hardness number are given in graphical form.
(Q27, Q29, S12, Au)

71-Q. Solving Problems in Materials. T. S. Fuller. *ASTM Bulletin,* Oct. 1952, p. 51-62.

Progress in materials which has contributed to advancement in the electrical industry during past 50 years. Cu, Cu with Ag and Cd, supply of Cu, permanent magnets, ferritic steels, ultrasonic testing, and oil-ash corrosion. Failure and stress of materials. Micrographs and graphs.
(Q general, T1, Cu, SG-n, ST)

72-Q. Fatigue of Metals. Orowan's Theory and Its Practical Implications. *Automobile Engineer,* v. 42, Dec. 1952, p. 529-531.

Theoretical discussion. Graphs.
(Q7)

73-Q. High Temperature Alloys for Gas Turbines. (Concluded) H. V. Kinsey. *Canadian Metals,* v. 15, Dec. 1952, p. 20, 22, 24.

Discussion and tabulated data on tensile strength, creep, and rupture properties at elevated temperatures.
(Q27, Q3, Q4, SS, SG-h)

74-Q. Optical Dynamic Weigh-Bar for a Fatigue-Testing Machine. P. G. Forrest. *Engineering,* v. 174, Dec. 19, 1952, p. 801.

Apparatus for measuring stress.
(Q7)

75-Q. Casting Design for Heavily Loaded Parts. E. T. Vincent. *Foundry,* v. 81, Jan. 1953, p. 94-97, 267-273.

Stresses which must be considered when designing castings. Diagrams and photographs. (Q25, E general)

76-Q. Creep Test Results Guide the Selection of Alloys for Turbines and Jet Engines. *Industrial Heating,* v. 19, Dec. 1952, p. 2260, 2262, 2390.

Brief description of Westinghouse laboratory. (Q3, T25)

77-Q. Aluminum Powder Products Compared. E. Gregory and N. J. Grant. *Iron Age,* v. 170, Dec. 25, 1952, p. 69-73.

Products from M-255, M-257, and SAP Al powder were tested in creep-rupture at temperatures from 400 to 900° F. for times up to 1000 hr. Gains in rupture life and creep resistance are achieved by Al powder products. Tables, graphs, and micrographs. (Q3, H general, Al)

78-Q. Cold Work Studies on Copper at Low Temperatures. R. R. Eggleston. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1400-1401.

Results of preliminary experiments on annealing of Cu cold worked at liquid He temperature, which suggests that two annealing states exist in temperature range of 140 to 20° C. Results of analysis of curves for activation energies by assuming a simple rate process for the annealing mechanism. Graphs.
(Q24, J23, Cu)

79-Q. Amplitude Pulsations in the Vibrational Strain Pattern of Metal Single Crystals. J. W. Marx. *Journal of Applied Physics,* v. 23, Dec. 1952, p. 1406-1407.

Briefly describes experiments using Zn. (Q21, Zn)

80-Q. Deformation of Magnesium at Various Rates and Temperatures. J. W. Suiter and W. A. Wood. *Journal of the Institute of Metals,* v. 20, Dec. 1952, p. 181-184.

X-ray and metallographic studies showed that polycrystalline Mg deforms similarly to Al and Zn in that a subgrain or cell structure is formed within grains. It appears necessary to postulate formation of crystallite "debris" at grain boundaries in order to correlate X-ray and metallographic observations. Micrographs. 11 ref.
(Q24, M26, Mg)

81-Q. Effect of Residual Stresses on Yielding and Strain-Aging of Carbon Steel. N. H. Polakowski. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 369-376.

Effect of large-scale residual stresses left in carbon steel after plastic deformation at room temperature on its mechanical properties after aging. Graphs. 18 ref.
(Q general, CN)

82-Q. Intergranular Brittleness in Iron-Oxygen Alloys. W. P. Rees and B. E. Hopkins. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 403-409.

Tensile and impact properties of high-purity iron and iron-oxygen alloys, at various temperatures covering tough to brittle transition. Graphs and micrographs. (Q23, Fe)

83-Q. The Properties of Some Binary Aluminium Alloys at Elevated Temperatures. J. V. Lyons and W. I. Pumphrey. *Metallurgia,* v. 46, Nov. 1952, p. 219-226; Dec. 1952, p. 299-304.

High-temperature tensile properties of binary alloys of Al with Cu, Fe, Mn, and Zn were determined. An examination was also made of effect of degree of approach to structural equilibrium on high-

temperature properties of certain alloys. Implications of the results. Micrographs and graphs. 7 ref. (Q general, Al)

84-Q. The Cottrell-Bilby Theory of Yielding of Iron. Takeo Yokobori. *Physical Review,* ser. 2, v. 88, Dec. 15, 1952, p. 1423.

Brief theoretical analyses. Graphs. (Q23, Fe)

85-Q. (French.) **Local Deformations in Simple Tension and Their Role in the Formation of the Neck.** P. Bastien, A. Popoff, and P. Azou. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 783-790; disc., p. 790.

The neck in Fe and Al was found to develop at the point of least strength due to microscopic defects caused by initial plastic deformation. Charts and photographs. (Q27, Fe, Al)

86-Q. (German.) **Effect of Volume and Surface on the Strength Properties of Materials.** G. Meyersberg. *Acta Polytechnica, Physics and Applied Mathematics Series,* v. 2, No. 2, 1952, 123 pages.

Analyzes and describes "volume effect" of test specimens using W. Weibull's theory. Second part discusses "boundary effect" which is opposite to volume effect and is especially significant for cast iron. The third part gives details of experiments on cast iron in bending, torsion, and shear. Tables, diagrams, and photographs. 70 ref. (Q1, Q2, Q5, CI)

87-Q. (German.) **Operating Stresses on Gear Wheels and the Determination of the Stress Resistance Characteristic of the Material.** A. Thum and K. Richard. *Schweizeizer Archiv für Angewandte Wissenschaft und Technik,* v. 18, Oct. 1952, p. 309-321.

Reviews the literature on the correlative effects of material (steel), shape, heat treatment, and type of stress on the life of gear wheels. Modern testing methods are critically evaluated. Diagrams, tables, and graphs. 46 ref. (Q25, ST)

88-Q. (German.) **Creep of Aluminum Wire Coil Springs.** Gerhard Lucas and Georg Masing. *Zeitschrift für Metallkunde,* v. 43, Oct. 1952, p. 341-349.

Experimental details. Results affirm the parabolic law for hard drawn specimens. Proposes new logarithmic flow for soft annealed and for hard drawn specimens at liquid-air temperature. Activation energy of plastic deformation was investigated. Tables, charts, 10 ref. (Q3, Q24, Al)

89-Q. (German.) **Experimental Determination of Stresses in Structural Parts.** S. Schwaigerer. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Nov. 11, 1952, p. 1025-1036.

Methods and instruments for measuring internal and load stresses. 27 ref. (Q25)

90-Q. (German.) **Proper Selection of Methods of Measuring Elongations.** Kurt Fink. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Nov. 11, 1952, p. 1037-1038.

Brief discussion. 25 ref. (Q27)

91-Q. (Russian.) **Solution of Axisymmetrical Problems of the Theory of Elasticity.** K. V. Solianik-Krassa. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 21, 1952, p. 481-485.

A mathematical discussion. (Q21)

92-Q. (Russian.) **The Mechanism of Inhibitor Action on Hydrogen Embrittlement of Steels in Sulfuric Acid.** Z. A. Iofa and E. I. Liakhovetskaia. *Doklady Akademii Nauk SSSR,* v. 86, Sept. 21, 1952, p. 577-580.

Bend tests on steel wires were used to study the above. Data are tabulated. 11 ref. (Q23, Q5, CN)

93-Q. Scope and Limitations of Photo-Elastic Stress Analysis. H. T. Jessop. *Engineering,* v. 174, Dec. 26, 1952, p. 833-834.

Two and three-dimensional techniques, transferring results from model to prototype, and accuracy of the photo-elastic method. Diagrams and photographs. (Q25)

94-Q. An Investigation of the Plastic Behaviour of Metal Rods Subjected to Longitudinal Impact. J. D. Campbell. *Journal of the Mechanics and Physics of Solids,* v. 1, Jan. 1953, p. 113-123.

Some experiments were carried out, using Al alloy, to obtain information regarding plastic deformation in metal under impact loading, using a new method of test in which some of the main difficulties of impact testing are avoided. Graphs. 8 ref. (Q6, Al)

95-Q. The Autofrettage of Thick Tubes With Free Ends. D. G. B. Thomas. *Journal of the Mechanics and Physics of Solids,* v. 1, Jan. 1953, p. 124-133.

Mathematical analysis of expansion by internal pressure of a partially plastic open ended tube of wall-ratio 2:1. Calculated surface strains are described by simple formulas, and comparison is made with previous solutions based on total stress-strain relations. Graphs. 6 ref. (Q23)

96-Q. The Mechanism of Fatigue of Metals. A. K. Head. *Journal of the Mechanics and Physics of Solids,* v. 1, Jan. 1953, p. 134-141.

Experiments show that there are three stages in fatigue of metals. Reviews previous investigations. 47 ref. (Q7)

97-Q. Bend Plane Phenomena in the Deformation of Zinc Monocrystals. John J. Gilman and T. A. Read. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 49-55.

Experimental work, results and theory. Micrographs and diagrams. 21 ref. (Q24, Zn)

98-Q. Preferred Orientations in Iodide Titanium. Carl J. McHargue and Joseph P. Hammond. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 57-61.

Wire textures for cold rolled and recrystallized iodide Ti and sheet textures for this material produced by cold and hot rolling, and recrystallization at a series of temperatures were determined. Effect of $\alpha \rightarrow \beta$ transformation on sheet texture. Diagrams. 13 ref. (Q24, N5, Ti)

99-Q. Torsion Texture of 70-30 Brass and Armco Iron. W. A. Backofen and B. B. Hundy. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 61-62.

Describes additional work on the subject. (Q1, Cu, Fe)

100-Q. Flow and Fracture Characteristics of the Aluminum Alloy 24S-T4 as Affected by Strain Thermal History. S. I. Liu and E. J. Ripling. *Journal of Metals,* v. 5, Jan. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers.* v. 197, 1953, p. 66-68.

Investigation and results. Graphs. 7 ref. (Q24, Al)

101-Q. Improving Fatigue Life. M. K. Gerla. *Machine Design,* v. 25, Jan. 1953, p. 171-173.

Tests on roller chain link plates which show comparative effects of several methods of inducing beneficial residual stresses. Graphs and photographs. (Q7)

102-Q. Trends in Hollow Drill Steel. W. H. McCormick and R. W. Persons. *Mining Congress Journal,* v. 38, Dec. 1952, p. 58-61.

New problems introduced, hardness vs. abrasion, stresses found in rods, and notch effect. Trend toward use of alloy steel rather than carbon steel is tabulated. (Q general, T6, TS)

103-Q. Influence of Nonmartensitic Transformation Products on Mechanical Properties of Tempered Martensite. J. M. Hodge and W. T. Lankford. National Advisory Committee for Aeronautics, Technical Note 2862, Dec. 1952 13 pages.

Experiments were conducted on SAE 4340 steel, partially isothermally transformed to specific high-temperature transformation products and quenched and tempered to hardness values of from 25-40 Rockwell C. Effects of upper bainite in amounts of 1, 5, 10, 20, and 50%, of 5% ferrite, and of 5% pearlite on tensile, impact, and fatigue properties are evaluated. (Q general, N8, AY)

104-Q. Delayed Brittle Fracture of Alloy Steel at Low Stress Levels. C. L. M. Cottrell. *Nature,* v. 170, Dec. 20, 1952, p. 1079-1080.

Results of tests on specimens receiving treatments similar to heat-affected zones of arc welding. (Q23, K1, AY)

105-Q. Work-Hardening of Annealed Mild Steel Under Static and Dynamic Conditions. A. W. Crook. *Nature,* v. 170, Dec. 27, 1952. p. 1124-1125.

Brief mathematical analysis. Graph. 3 ref. (Q24, CN)

106-Q. A Critical Evaluation of the Norelco High Angle X-Ray Spectrometer for Elastic Strain Measurements. S. R. Maloof and H. R. Erard. *Review of Scientific Instruments,* v. 23, Dec. 1952, p. 687-692.

Theory of measuring elastic strains in metals with an X-ray spectrometer. Comparison with X-ray back-reflection film method. Effect of elastic anisotropy on X-ray stress determinations. Example is given of an X-ray determination of Poisson's ratio in different crystallographic directions in a FS8742 steel. Graphs and diagrams. (Q21, AY)

107-Q. On the Rigidity Modulus and Its Temperature Coefficient of the Alloys of Cobalt, Iron, and Chromium. Hakaru Masumoto and Hideo Saito. *Science Reports of the Research Institutes, Tohoku University,* v. 4, June 1952, p. 246-254.

Investigation to measure modulus of rigidity and its temperature coefficient for alloys of Co, Fe, and Cr with specimens in the form of thin wire. Tables and graphs. (Q23, Co, Fe, Cr)

108-Q. Influence of Mechanical and Electrolytic Polishing on the Micro and Macro Hardness of Metals. *Sulzer Technical Review,* no. 3, 1952, p. 17-23.

Influences of various methods of polishing and results of experimental measurements. Conclusions drawn are confirmed by microscopic investigation of metal and X-ray diffraction photographs. Materials used

were austenitic Cr-Ni steel, electrolytic Fe, and carbon steel.
(Q29, M21, SS, Fe, CN)

109-Q. Mechanical Strength of Carbon Steels At High Temperatures. M. A. Zaikov. Henry Brutcher Translation 2860, 20 pages. (From *Zhurnal Teknicheskoi Fiziki*, v. 19, no. 6, 1949, p. 684-695.)

A series of experiments to gather data on plasticity and strength of carbon steel. (Q23, CN)

110-Q. Bending Fatigue Strength of Nitrided Specimens Having Different Diameters. K. Wellinger and P. Gimmel. Henry Brutcher Translation 2946, 4 pages.

Previously abstracted from original in *Archiv für das Eisenhüttenwesen*. See item 719-Q, 1952.
(Q5, SS)

111-Q. (French.) **Intercrystalline Fracture of Aluminum-Zinc Alloys.** Eric-Charles Perryman. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences*, v. 235, Oct. 20, 1952, p. 884-886.

Experiments confirm hypothesis that these alloys, when aged at room temperature, exhibit an exterior grain zone which is less hard than the interior, creating a mechanism which retards intercrystaline fracture. (Q26, Al, Zn)

112-Q. (French.) **Service Fractures of Castings Under Cyclic Stresses.** Henri de Leiris. *Fonderie*, v. 81, Oct. 1952, p. 3125-3129.

Properties necessary to withstand repeated stresses. Examples.
(Q26, E general)

113-Q. (French.) **Fracture of Ferrous Metals by Corrosion and by the Mechanical Stresses Associated With Corrosion.** E. Herzog. *Métaux Corrosion Industrie*, v. 27, Sept. 1952, p. 329-357.

Fracture of ferrous metals by means of interaction of corrosion and static stresses, and fracture caused by corrosion and dynamic stresses. Tables, graphs, and micrographs. 23 ref. (Q26, R1, Fe)

114-Q. (German.) **Cracks in Pipe Bends.** Siegfried Berg. *Brennstoff-Wärme-Kraft*, v. 4, Dec. 1952, p. 413-415.

Observations were made of cracks along the "neutral fibers". Superheated and cast pipe bends showed that stress inside pipe, caused by bending, is covered by a well-distributed normal stress which can lead to a high total stress and, under a change of load, to fracture. Photographs. 10 ref. (Q5)

115-Q. (German.) **Hypotheses on the Effect of Size and Shape During Repetition of Dynamic Stress.** A. Troost. *Metall*, v. 6, Nov. 6, 1952, p. 665-674.

Review on basis of literature. Law of similarity and notch effect, types of experimental investigations, stress and deformation, law of uniform relative stress decay, constancy of depth of stress zone, and influence of stress gradients. Diagrams. 45 ref. (Q27)

116-Q. (German.) **Practical and Specialized Application of the Turning Process for the Determination of Residual Stress.** H. Bühler and W. Schreiber. *Metall*, v. 6, Nov. 6, 1952, p. 685-688.

Practical application of the Heyn-Bauer process to specialized processes. Data are tabulated and charted. 11 ref. (Q25, ST)

117-Q. (German.) **The Hardness Measurement During Ball Pressure Tests With Depth Measurement of Preliminary Load.** H. Kostron. *Metall*, v. 6, Nov. 6, 1952, p. 688-692.

A process by which ball pressure hardness, according to class, can be determined with preliminary-load hardness testers. Advantages of the process. Diagrams. 18 ref. (Q29)

118-Q. (German.) **The Complete Determination of a Characteristic State of Tension in Solid and Hollow Metallic Cylinders.** Hans Bühler. *Zeitschrift für Metallkunde*, v. 43, Nov. 1952, p. 388-395.

Electrical strain gages were used to determine the stress state of steel and brass cylinders. Includes charts and tables. 32 ref.
(Q25, Cu, ST)

119-Q. (Italian.) **The Effect of the Dimension in the Fatigue Tests of Metals. Statistical Results.** R. Cazaud. *La Metallurgia Italiana*, v. 44, Oct. 1952, p. 512-517.

Significance of results of alternating tension-compression and rotating beam tests. Composition, mechanical properties, and statistical results are tabulated. Diagrams. 12 ref. (Q7)

120-Q. (Book.) **Advanced Mechanics of Materials. Ed. 2.** F. B. Seely and J. O. Smith. 680 pages. John Wiley & Sons, Inc, 440 4th Ave., New York 16, N. Y. $8.50.

Considers mechanical properties of materials for advanced undergraduate and graduate students as well as engineers. Developments of 20 years since first edition are added; two new parts are on influence of small inelastic strains on load-carrying capacity of members, and on instability—buckling loads. Also two new appendixes.
(Q general)

121-Q. (Book.) **Theory of Elasticity and Plasticity.** H. M. Westergaard. 176 pages. 1952. Harvard Univ. Press, Cambridge, Mass.; John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $5.00.

Serves as an introduction to the theories of elasticity and plasticity, written from the point of view of the engineer although the treatment is entirely thecretical. A historical chapter and details of stress, strain, Hooke's law basic equation of elasticity, laws of plasticity, strain potential, hollow cylinders and spheres, inertia forces, thermal stresses, the Galerkin vector, and effects of a single force. (Q21, Q23)

122-Q. Strength Tests by Towing in Water. Winfried Braun. *Aircraft Engineering,* v. 25, Jan. 1953, p. 22-25.

Aircraft components were towed under water in a large tank so that loads were produced on specimen equivalent to those realized under actual flight conditions. Advantages of method were that no special means for transmitting forces to specimen were needed and that all changes of air loads resulting from elastic deformation were automatically included in applied loading. Diagrams and graphs. (Q23)

123-Q. Creep Resisting Ferritic Steels for Gas Turbines. H. W. Kirkby. *Alloy Metals Review,* v. 8, Dec. 1952, p. 2-6.

Properties of existing creep resisting ferritic steels, Mo-V steel and 3% Cr-Mo-W-V steel, are reviewed in relation to possible industrial gas turbine applications. Discussion is confined to materials for turbine disks or rotors and turbine blades. Graphs and tables. 9 ref. (Q3, T25, AY)

124-Q. An Inquiry Into the Reproducibility of Impact Test Results. H. L. Fry. *ASTM Bulletin,* Jan. 1953, p. 61-64; disc., p. 64-66.

Previously abstracted from American Society for Testing Materials, Preprint 67; see item 619-Q, 1952. (Q6, CN, AY)

125-Q. A Routine Method for the Measurement of Residual Stresses in Plates. R. G. Boiten and W. Ten Cate. *Applied Scientific Research,* sec. A, v. 3, 1952, p. 317-343.

Modification of "drill-hole" method of Mathar and Soete. Theoretical relations governing problem are derived and compared with test results. (Q25)

126-Q. Properties of Some High-Aluminum Zinc-Base Die Casting Alloys. O. A. Carson. *Canadian Mining and Metallurgical Bulletin,* v. 46, Jan. 1953, p. 13-16; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 56, 1953, p. 1-4.

Investigation to determine tensile, impact and hardness data. (Q27, Q29, Q6, Zn)

127-Q. Photo-Elastic Research on Plates in Transverse Bending. Albrecht Kuske. *Engineering,* v. 175, Jan. 2, 1953, p. 20-21; Jan. 9, 1953, p. 36-39.

New method and some results obtained by using it. Photographs of stress patterns, and diagrams. (Q25)

128-Q. Tests on Small Triangulated Steel Frames. R. W. Steed. *Engineering,* v. 175, Jan. 9, 1953, p. 52-53.

Electrical resistance strain gages were used in conjunction with Wheatstone bridge to measure strains in above frames which were loaded in an Avery testing machine. Photographs and diagrams. (Q25, ST)

129-Q. Testing Nuts and Bolts for Resistance to Vibration. *Engineering,* v. 175, Jan. 9, 1953, p. 54-55.

Design and use of the machine developed by Lester Lock Nut and Washer Co. Ltd., Wordsley, Staffordshire. (Q9)

130-Q. Creep Properties of Steels for Power Plants. I. A. E. Johnson and N. E. Frost. *Engineering,* v. 175, Jan. 2, 1953, p. 25-28; Jan. 9, 1953, p. 58-60.

Tests and results of using carbon steel, Mo steel, and Mo-V steel to examine effects of practically possible fluctuations of stress and temperature on creep properties. Tables and graphs. (Q3, CN, AY)

131-Q. Evolution of Engineering and High-Strength Irons. M. Ballay. *Foundry Trade Journal,* v. 94, Jan. 8, 1953, p. 41-45.

Mechanical properties of unalloyed gray irons and alloyed cast irons; methods of heat treatment; cast irons with spheroidal graphite; corrosion resisting and special-duty cast iron; and resistance to wear and friction. (Q general, J general, CI)

132-Q. Deformation by Transformation Makes Alloys Tougher. E. S. Machlin. *Iron Age,* v. 171, Jan. 22, 1953, p. 106-109.

Deformation by cold working or applying stress increases mechanical properties of most malleable metals. By applying strain through phase transformation more deformation can be accomplished in shorter time which decreased notch sensitivity and increased impact resistance. Austenitic steels, stainless steel, and Ti alloy are discussed. Graphs, diagrams, and micrographs. 4 ref. (Q24, N8, SS, AY, Ti)

133-Q. Creep at 250° and 300° C. of Some Magnesium Alloys Containing Cerium. G. A. Mellor and R. W. Ridley. *Journal of the Institute of Metals,* v. 81, Jan. 1953, p. 245-253.

Experimental data and results. Graphs, tables, and micrographs. (Q3, Mg)

134-Q. The Experimental Production of Small Tensile Specimens by Electrolytic Solution (Electro-Turning). M. H. Farmer and G. H. Glaysher. *Journal of Scientific Instruments,* v. 30, Jan. 1952, p. 9-10.

Production of both parallel gage lengths and grooves in uniform round bar material by electro-turning is practicable, and leaves a surface essentially free from machining deformation. Method should be useful in research on very hard and very soft metals, and on single metallic crystals. Cu and Fe were used in experiments. (Q27, G17, Cu, Fe)

135-Q. Galling and Seizing Characteristics of Titanium and Titanium-Base Alloys. *Mechanical Engineering Department, Carnegie Institute of Technology,* Interim Technical Report 1, Oct. 15, 1951-Apr. 15, 1952, 14 pages.

Importance of area of contact, normal load, roughness, adhesion, adsorbed films, and temperature in friction and seizing. (Q9, Ti)

136-Q. Galling and Seizing Characteristics of Titanium and Titanium-Base Alloys. William C. Leone. *Mechanical Engineering Department, Carnegie Institute of Technology,* Interim Technical Report 2, Apr. 15, 1952—Oct. 15, 1952, 16 pages.

Equipment for doing experimental work on friction characteristics for various loads and speeds. Results of tests. (Q9, Ti)

137-Q. Creep of Non-Ferrous Metals. K. Löhberg. *Metal Industry,* v. 82, Jan. 2, 1953, p. 3-6.

Previously abstracted from *Metall;* see item 859-Q, 1952. (Q3, Pb, Cu, Al, Mg, Zn)

138-Q. The Determination of the Energy Stored in a Metal During Plastic Deformation. L. M. Clarebrough, M. E. Hargreaves, D. Michell, and G. W. West. *Proceedings of the Royal Society,* ser. A, v. 215, Dec. 22, 1952, p. 507-524.

New apparatus for measurement of stored energy and results obtained. Results for specimens of electrolytic Cu deformed in torsion show that stored energy increases with deformation in a similar way to torque required to produce deformation. Diagrams and graphs. 9 ref. (Q24, Cu)

139-Q. A Study of the Practical Efficiency Under Static Loading of Riveted Joints Connecting Plates. W. M. Wilson, W. H. Munse, and M. A. Cayci. *University of Illinois Engineering Experiment Station,* Bulletin Series No. 402, July 1952, 75 pages, (v. 49, No. 78).

Comprehensive description of tests. Graphs and tables. (Q23, K13, ST)

140-Q. The Effect of Chromium Plating on the Endurance Limit of 4340 Steel. George M. Cabble, Jr. *Virginia Polytechnic Institute Engineering Experiment Station,* Series No. 82, Nov. 1952, 20 pages, (v. 66, No. 1).

Effect was determined by rotating beam fatigue tests on five groups of specimens: 4340 steel not plated, plated once, plated once and baked once, plated twice, and plated twice and baked twice. (Q7, L17, AY)

141-Q. Evaluation of Brittle Failure Research. E. F. Sweeney. *Welding Journal,* v. 32, Jan. 1953, p. 1s-13s.

Transition temperatures for various specimens and criteria, and their significance. Old and new ABS steels are compared, including plates in which service failures originated. Tables and graphs. (Q23, CN)

142-Q. Factors Affecting Resistance of Pressure Vessel Steels to Repeated Overloading. J. H. Gross, S. Tsang, and R. D. Stout. *Welding Journal,* v. 32, Jan. 1953, p. 23s-30s.

Biaxial fatigue studies in plastic range with zero to tension vs. reversed bending; effect of surface stress raisers, preheating, postheating and use of low-alloy steels. (Q7, AY)

143-Q. Fatigue Tests of Steel Girders. Hans Bühler. *Welding Journal,* v. 32, Jan. 1953, p. 52s-54s. (From *Stahl und Eisen,* v. 72, 1952, p. 1035-1037.)

Data are tabulated and graphed. (Q7, AY)

144-Q. (French.) **Influence of the Fatigue Phenomenon on the Modulus of Elasticity of Steels.** Andre Kovacs and Pierre Laurent. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 10, 1952, p. 1103-1104.

No change of the modulus was observed during tests on Ni-Cr structural steel. (Q21, AY)

145-Q. (French.) **Influence of Fatigue on the Magnetic Properties of Steels.** Andre Kovacs and Pierre Laurent. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 17, 1952, p. 1224-1226.

Effects of repeated stresses on magnetic permeability. Tests were made on nickel-chromium structural steel. Data are charted. (Q7, P16, AY)

146-Q. (French.) **The Deformation and Polygonization of Aluminum Monocrystals.** Honoré Lambot and Lawrence Vassamillet. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 17, 1952, p. 1232-1234.

Application of X-ray transmission to study of modifications occurring in metals during various mechanical and thermal treatments. Results are discussed. (Q24, M22, Al)

147-Q. (French.) **Results of Some Measurements on Nimy-Maisieres Bridge Beams.** V. Degreef and A. Soete. *L'Ossature Metallique,* v. 17, Nov. 1952, p. 553-559.

Strain-gage measurements, apparatus used, static and dynamic tests, and variations of testing for different parts of the bridge. (Q25, T26, ST)

148-Q. (French.) **The Resistance to Fatigue, or Endurance.** R. Cazaud. *Métaux Corrosion—Industries,* v. 27, Oct. 1952, p. 386-400.

Reviews literature. Causes of fatigue, endurance limit, endurance tests, numerical values for endurance limit, and influence of various factors upon endurance. Tables, charts, diagrams. 9 ref. (Q7)

149-Q. (French.) **How to Determine Internal Stresses in Bars and Tubes by the Saches Drilling Method.** Hans Bühler and Walter Schreiber. *Métaux Corrosion—Industries,* v. 27, Oct. 1952, p. 414-419.

Equations for calculations are derived. Transformed approximation equations are suggested as a time-saving aid. Examples of applications. 13 ref. (Q25)

150-Q. (German.) **Cup-Drawing Test Procedure for Determining the Deep-Drawing Properties of Sheet and Strip.** H. Beisswanger. *Metall,* v. 6, Dec. 1952, p. 744-753.

The Erichson test is shown to be less satisfactory for evaluating drawing properties than the cup-drawing test. 19 ref. (Q23, G4, CN, SS, Cu, Al)

151-Q. (German.) **Hypotheses on the Influence of Size and Form Upon Dynamic Fatigue Stress.** A. Troost. *Metall,* v. 6, Dec. 1952, p. 756-762.

Best-known hypotheses were investigated and compared with obstruction to plastic deformation hypothesis. All hypotheses observed can be presented as special cases of the obstruction hypothesis. 56 ref. (Q7)

152-Q. (German.) **Changes in the Concept of Permanent Deformation.** W. Engelhardt. *Metall,* v. 6, Dec. 1952, p. 762-764.

Studies on "spontaneous expansion" have caused a change in the concept of permanent deformation. It is now considered as being purely mechanical with a thermal component instead of a thermodynamic process. (Q24, P12)

153-Q. Creep of Steel at Room Temperature Under Static Load. W. Jäniche and G. Thiel. Henry Brutcher, Translation 2945, 3 pages.

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 363-Q, 1950. (Q3, CN)

154-Q. The Propagation of Fractures in Mild-Steel Plates. G. Murray Boyd. *Engineering,* v. 175, Jan. 16, 1953, p. 65-69; Jan. 23, 1953, p. 100-102.

Propagation of fractures in wide plates on the basis of simple assumptions in terms of mechanical concepts. Does not include theories of ordinary concepts of stress and strain. Diagrams, photographs, and micrographs. 27 ref. (Q26, CN)

155-Q. Foil Strain Gauges for Torque and Pressure Measurement. *Engineering,* v. 175, Jan. 23, 1953, p. 119.

Brief description. (Q25)

156-Q. Working Stresses and Working Strength of Spur Gears. A. Thum and K. Richard. *Engineers' Digest,* v. 14, Jan. 1953, p. 9-12.

Previously abstracted from *Schweizer Archiv für Angewandte Wissenschaft und Technik.* See item 87-Q, 1953. (Q25, ST)

157-Q. (French.) **Thermal Properties of 2.2% Cr and 1% Mo Steel for Use in Steam Superheated to Around 550° C.** P. Cattier. *Fourth International Congress on Industrial Heating* (Paris), 1952, no. 5, 10 pages.

Includes micrographs, tables, and charts. (Q general, AY)

158-Q. (French.) **Creep Tests and Extrapolation of Their Results to Long-Time Tests.** W. Siegfried. *Fourth International Congress on Industrial Heating* (Paris), 1952, no. 145, 19 pages.

A detailed study was made of the relation between actual stress and rate of flow in long-time tests. Relationships between theoretical and experimental stress-rupture values are discussed. (Q3)

159-Q. (French.) **Prior Cold Work and Mechanical Strength of the Austenitic Stainless Steels at Elevated Temperatures.** Rene Castro, Andre Gueussier, and J. de Lacombe. *Fourth International Congress on Industrial Heating* (Paris), 1952, no. 180, 11 pages.

Influence of C, Mo, W and Ti on resistance of 18-8 to softening after cold working. Parallelism between the mechanical behavior at high temperature and resistance to softening after cold working; theoretical and practical conclusions. Estab-

lishes critical duration of loading or critical temperature beyond which the favorable effect of the cold work disappears. (Q23, Q24, SS)

160-Q. Ductile Iron. Watch Copper Buildup. J. C. Neemes. *Iron Age,* v. 171, Feb. 5, 1953, p. 162-164.

Small amounts of Cu increase strength and hardness, and reduces ductility in the as-cast condition. Advantages, disadvantages and how the latter may be improved. (Q23, CI, Cu)

161-Q. The Elastic Constants of Cu —4 Percent Si. Charles S. Smith and J. W. Burns. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 15-18.

Fundamental shear constants of this alloy and of 28% Zn copper alloy are analyzed in terms of the electrostatic and ionic contributions to the shear stiffness of pure Cu. 9 ref. (Q21, Cu)

162-Q. X-Ray Study of Cold Work in Thoriated Tungsten. M. McKeehan and B. E. Warren. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 52-56.

Experiments using powder samples prepared from sintered and swaged W rods. 6 ref. (Q24, H general, W)

163-Q. The Initial Yield in Iron. H. W. Paxton. *Journal of Applied Physics,* v. 24, Jan. 1953, p. 104-105.

Series of experiments previously made on single crystals and polycrystals of Fe, and different explanations for the similar behavior. Graphs. 5 ref. (Q23, Fe)

164-Q. The Notched Slow-Bend Test as a Brittle-Fracture Test. J. E. de Graaf and J. H. van der Veen. *Journal of the Iron and Steel Institute,* v. 173; Jan. 1953, p. 19-30.

Experiments that led to choice of a 3-mm. deep pressed notch in standard test, and, in addition, experience with deeper notches, especially in regard to conditions affecting arrest of crystalline fracture, are discussed. Phenomena at root of notch up to start of incipient fracture, and those related to strain distribution in bending. Graphs. (Q5, CN)

165-Q. Effect of Tensile Strain at Low Temperatures on Deformation Twinning in Ingot Iron. Glenn W. Geil and Nesbit L. Carwile. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 213-217.

Metallographic study was made of deformation twinning (Neumann lamellae) in ingot iron slowly deformed in tension at −196 and −150° C. Micrographs. 6 ref. (Q24, Fe)

166-Q. Slip and Grain Boundary Sliding as Affected by Grain Size. Nicholas J. Grant, Italo S. Servi, and Arup Chaudhuri. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 217-218.

Experiments in which 2S Al was used. Micrographs. (Q24, Al)

167-Q. Mechanism of Plastic Flow in Titanium. Determination of Slip and Twinning Elements. F. D. Rosi, C. A. Dube, and B H. Alexander. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 257-265.

Slip and twinning elements were determined in deformed coarse crystals of arc-melted 99.77% Ti. Method of identification was based on use of stereographic plot of a back-reflection Laue photograph describing region where slip and twinning were observed. Diagrams and micrographs. 24 ref. (Q24, Ti)

168-Q. Mechanical Properties of High Purity Ti-Al Alloys. H. R. Ogden, D. J. Maykuth, W. L. Finlay, and R. I. Jaffee. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 267-272.

Methods of investigation, fabricating and annealing characteristics, physical properties, mechanical properties, effects of heat treatment, weldability, density, and air oxidation. Graphs and tables. 4 ref. (Q general, J general, P general, K9, Ti, Al)

169-Q. Kinetics of Thermal Reorientations in Cold Rolled Zirconium. R. K. McGeary and B. Lustman. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 284-291.

Orientation relationships and rates of annealing of 97% cold rolled Zr were studied by X-ray techniques, metallography, and hardness measurements. Process of annealing occurring by formation of domains, and their subsequent growth without recrystallization. Diagrams and graphs. 27 ref. (Q24, Zr)

170-Q. Cold-Rolling and Annealing Textures of Molybdenum Single Crystals. N. K. Chen and R. Maddin. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 300-304.

Single crystals of Mo were deformed by rolling with respect to specific crystallographic planes and directions. Annealing treatments

were carried out after deformation to study recrystallization characteristics as well as recrystallization texture. Diagrams. 10 ref. (Q24, N5, Mo)

171-Q. Grain Boundary Sliding and Migration and Intercrystalline Failure Under Creep Conditions. Hsing C. Chang and Nicholas J. Grant. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 305-312.

Creep of coarse-grained high-purity Al was studied at 400-1100° F. with an initial stress range of 50-1200 psi. Process of boundary sliding and migration. Theory regarding role the grain boundaries play under creep conditions. Diagrams and micrographs. (Q3, Al)

172-Q. Nature of the Creep Curve. Thomas H. Hazlett and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 318-323.

Ni was selected as base material for investigation and an experimental program was initiated to determine effects of temperature and stress on creep characteristics. Graphs. 8 ref. (Q3, Ni)

173-Q. Some Observations on Correlations Between the Creep Behavior and the Resulting Structures in Alpha Solid Solutions. Oleg D. Sherby and John E. Dorn. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 324-330.

Correlates creep properties of dilute α solid solutions in Al with subgrain structures that are developed during creep. Micrographs, graphs, and photographs. 11 ref. (Q3, M27, Al)

174-Q. Creep Properties of Commercially Pure Titanium. W. R. Kiessel and M. J. Sinnott. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 331-338.

Creep characteristics of Ti sheet in annealed state, cold worked state, and cold worked and recovered state in 75-750° F. range were determined. Effect of strain aging on creep, and possible explanation for poor creep properties of Ti. Graphs. 20 ref. (Q3, Ti)

175-Q. Development of Mechanical and Magnetic Hardness in a 10 Pct V-Co-Fe Alloy. Richard W. Fountain and Joseph F. Libsch. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 349-356.

Experimental procedure, thermal analysis measurements, X-ray diffraction analysis, hardness and electrical resistivity measurements, magnetic properties, and correlation of structure and mechanical hardness. 11 ref. (Q29, P16, V, Co, Fe)

176-Q. Design Criterion for Fatigue of Wings. P. B. Walker. *Journal of the Royal Aeronautical Society,* v. 57, Jan. 1953, p. 12-18.

Results of tests to achieve consistency for a diversity of operating conditions, and a variety of aircraft types. (Q7, T24)

177-Q. A Method of Measuring Post-Yield Strain. F. J. Woodcock and K. R. Weiss. *Journal of the Royal Aeronautical Society,* v. 57, Jan. 1953, p. 49-51.

Use of Cu-Ni wire strain gages. Diagrams. 5 ref. (Q25, Q27, Ni, Cu)

178-Q. Strong, Heat Resistant Alloys and Metallic Combinations. Andre Michel. *Metal Progress,* v. 63, Jan. 1953, p. 120-124.

Advantages and disadvantages of ferritic vs. austenitic steels regarding creep resistance. Powder metallurgy and cermet developments are surveyed. (Q3, Q general, H general, AY, SS)

179-Q. A Theoretical Examination of the Plastic Deformation of Crystals by Glide. J. F. W. Bishop. *Philosophical Magazine,* v. 44, Jan. 1953, p. 51-64.

Proofs are given of theorems stated in Bishop-Hill theory of crystal distortion. Mathematical relations are established for deformation of crystals by simultaneous shears, and possibility of enforcing an arbitrary strain by glide is examined. Uniform stress states not exceeding critical shear stresses in glide directions are discussed, and a geometrical picture of stress and strain states is developed. Diagrams. 4 ref. (Q24)

180-Q. The Structure of Deformation Bands. Edward W. Hart. *Physical Review,* ser. 2, v. 89, Jan. 15, 1952, p. 521-522.

Shows that, if components of parallel pairs were edge type dislocations, such a group could form a stable array and this array would have a property which has been observed for deformation bands in metal crystals deformed in tension. Diagrams. 3 ref. (Q24, M26)

181-Q. Apparatus for Measuring Internal Friction in Transversely Vibrating Metal Reeds. W. R. Jewell. *Review of Scientific Instruments,* v. 24, Jan. 1953, p. 5-10.

Includes description of a symmetrical transducer for inducing vibrations and an optical method of observing amplitude. Measurements can be made while nonferromagnetic reed is temperature controlled and vibrating in a vacuum. Diagrams. 2 ref. (Q22)

182-Q. (French.) **Effect of Hydrogen on the Characteristics of Deformation and Rupture of Iron and Steel in Tension.** *Revue de Métallurgie,* v. 49, Dec. 1952, p. 837-848.

A study was made of effects of H_2 introduced at room temperature on slip, technical cohesive strength, and brittleness. Data are tabulated and charted. 16 ref. (Q27, Fe, CN)

183-Q. (French.) **The Mechanical Properties and the Suitability for Cold Working of Improved Basic Bessemer Steel.** R. Langers, H. Herbiet, and F. Montbrun. *Revue Universelle des Mines, de la metallurgie des Travaux Publics, des Sciences et des Arts Appliques a l'Industrie,* ser. 9, v. 8, Nov. 1952, p. 438-450.

Previously abstracted from 4th International Mechanical Engineering Congress, June 1952. See item 921-Q, 1952.

184-Q. (Dutch.) **Electron Microscope Investigation of Metal Surfaces. II. Adaptations for Metal Research.** D. A. Beekhuis and J. A. Schuchmann. *Metalen,* v. 7, Dec. 31, 1952, p. 444-458.

Results of electron microscope in wear tests and on concrete reinforcing wire. 25 ref. (Q9, M21, Cu, Al, CI, ST)

185-Q. Wear Properties of Ductile Cast Iron. *Product Engineering,* v. 24, Feb. 1953, p. 125-127.

Laboratory tests and use of Fe in piston rings, cylinders, gears, dies, and bearings. Photographs, tables, and graphs. (Q9, CI)

186-Q. Relation of Preheating to Embrittlement and Microcracking in Mild Steel Welds. A. E. Flanigan and T. Micleu. *Welding Journal,* v. 32, Feb. 1953, p. 99s-106s.

Extension of studies concerned with a type of embrittlement affecting mild steel arc welds which are allowed to cool too rapidly through low-temperature range following welding. Limited principally to considerations of weld metal behavior. (Q23, K1, CI)

187-Q. Fatigue Tests on Defective Butt Welds. W. G. Warren. *Welding Research,* v. 6, Dec. 1952, p. 112r-117r.

Tests on mild steel plates. Details of the investigation. Tables and X-radiographs. (Q7, CN)

188-Q. (Book.) **Analytic Mechanics. Ed. 3.** V. M. Faires and S. D. Chambers. 608 pages. 1952. Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $5.50.

Covers force analysis of statically determinate structures with emphasis on free body method of analysis. New additions include more problems and examples, 247 new line drawings; numerous biographical and historical sketches; chapter on vibrations; new topics on gyroscopic action, dimensional analysis, and common mathematical relations. (Q general)

189-Q. (Pamphlet.) **Developments Concerning the Properties of Cast Steels.** Charles W. Briggs. Steel Founders' Society of America (Cleveland), Nov. 1952, 19 pages.

Hardenability, time-temperature-transformation curves, and austenite grain size of cast steel. Also information on heat treatments. Graphs, tables, and micrographs. (Q general, J26, M27, N8, CI)

190-Q. (Book.) **Fatigue of Metals. Ed. 3.** R. Cazaud. A. J. Fenner, translator. 1953. Chapman & Hall, Ltd., 37-39 Essex St., London, W. C. 2. £3-0-0.

Translated from the French. Of particular interest to airplane workers and designers. Includes historical background, characteristics of fatigue failures, fatigue tests and testing machines, and influence of surface conditions. (Q7)

191-Q. (Book.) **Mechanics of Materials.** Alvin Sloan. 416 pages. 1952. Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $5.00.

Establishes as central theme basic flexure theory, with longitudinal shear, deflection, and other concepts treated as natural corollaries. Mohr's circle is built in as a basis of analysis throughout, and is applied to strain and to moments of inertia. Simplified presentation of true stress, torsion of thin shells, shear centers, curved beam, and application of failure theories in combined loading are also included. (Q general)

192-Q. (Book) **Metal Data Ed. 2.** Samuel L. Hoyt. 526 pages. 1952. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $10.00.

Revised edition of "Metals and Alloys Data Book". Bulk of material is offered in nearly 700 tables and graphs with a minimum of descriptive text. Information on such metallic properties as tensile strength; hardenability; thermal expansion; creep strength; endurance limit and yield strength at normal, subnormal, and elevated temperatures; and for various conditions of mechanical treatment. Special fea-

tures include a listing of commonly used test bars, hardness tests, corrosion data, conversion factors, applications of materials and properties of elements. (Q general)

193-Q. (Pamphlet.) **Some Mechanical Properties of Cast Steels.** Steel Founders' Society of America (Cleveland), Nov. 1952, 15 pages.

Response of cast stee's to various heat treatments, plus effects of adding alloys to plain carbon cast steels.
(Q general, J general, CI)

194-Q. Fatigue of Ferrous Metals. A Phenomenological Approach. H. L. Cox. *Iron & Steel,* v. 26, Feb. 1953, p. 45-50.

Collection of existing experimental evidence. Introduces hypothetical conceptions to correlate known facts. Tables and graphs. (Q7, Fe)

195-Q. Ferritic Steels. Developments in Creep Resistance. J. O. Ward and J. R. Rait. *Iron & Steel,* v. 26, Feb. 1953, p. 59-62.

Creep theory, its development, early ferritic steels, ferrite strength, 3% Cr-Mo-W-V alloy, 12% Cr alloy, and heat treatment.
(Q3, J general, AY)

196-Q. On Torsional-Flexural Buckling of Columns. H. L. Langhaar. *Journal of the Franklin Institute,* v. 255, Feb. 1953, p. 101-112.

Theoretical treatment based on the general theory of elastic stability. (Q28, Q1)

197-Q. On the Flexibility of Wire Ropes. Einosuke Mikumo, Tochio Aida, and Masaki Oshiumi. *Memoirs of the Faculty of Engineering, Kyoto University,* v. 14, Oct. 1952, p. 235-242.

Bending tests in which modulus of elasticity for bending rigidity showed a constant value with respect to construction, regardless of size. Tables and graphs. (Q5)

198-Q. Failures in Welded Ships. *National Bureau of Standards Technical News Bulletin,* v. 37, Feb. 1953, p. 24-29.

Causes of structural failures and basic factors involved in prevention. Diagrams, photographs, and tables. (Q26, K9, ST)

199-Q. Exudation of Material From Slip Bands at the Surface of Fatigued Crystals of an Aluminium-Copper Alloy. P. J. E. Forsyth. *Nature,* v. 171, Jan. 24, 1953, p. 172-173.

Brief discussion. Diagrams. 3 ref. (Q24, Al, Cu)

200-Q. A Dislocation Model for the Study of Boundary Phenomena and Deformation in Metals. W. I. Pumphrey. *Nature,* v. 171, Jan. 31, 1953, p. 218.

Construction of a dislocation model which aids investigation of deformation in a polycrystalline mass under a rapidly applied force. Micrographs. (Q24)

201-Q. Methods for Improvement of Drill-Collar Joints Evaluated by Full Size Fatigue Tests. L. E. Trishman. *Petroleum Engineer,* v. 25, Feb. 1953, p. B98, B100, B102, B105, B107-B108, B110, B112.

Basic fatigue test data, fatigue tests of nitrided notched bars, cold rolled notch fatigue tests, thread rolling, and full-size fatigue tests of threaded joints. Photographs, graphs, and diagrams. (Q7, CN)

202-Q. What Causes Stresses in Brake Beams. *Railway Locomotives and Cars,* v. 127, Feb. 1953, p. 45-48.

Laboratory and road tests conducted in conjunction with development of a one-piece cast steel brake beam for freight cars. Photographs. (Q25, T23, CI)

203-Q. Experimental Stress Analysis. J. P. Vidosic. *Research Engineer,* v. 7, Jan. 1953, p. 3-4, 15-20.

Some of the applications and methods now in use. 14 ref. (Q25)

204-Q. Investigation of Hot Tears in Steel Castings. *Transactions of the American Foundrymen's Society,* 1952, v. 60, p. 137-162.

Includes "Test Specimen for Evaluating Hot Tearing in Steel Castings", Gordon W. Johnson; "Evaluation of Hot Tear Test Casting", G. A. Lillieqvist and J. H. Fuqua; and "Hot Tear Investigation", C. H. Wyman, C. A. Faist, and Geo. Di Sylvestro. Work carried out by Armour Research Foundation, American Steel Foundry, and Burnside Steel Foundry Co. Tables, graphs, diagrams, and photographs.
(Q27, CI)

205-Q. Commercial Experience With Higher Silicon Nodular Irons. Richard Schneidewind and Howard H. Wilder. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 322-329; disc., p. 329.

Investigation to study effect of Si on ductile nodular irons. 12 ref.
(Q general, E25, CI)

206-Q. Influence of Phosphorus on Hot Tear Resistance of Plain and Alloy Gray Iron. John C. Hamaker, Jr. and Wm. P. Wood. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 501-510.

Procedure developed for tensile testing gray iron on direct cooling from liquid state in a sand mold at normal rates of strain. Method provides a means of measuring properties of gray iron shortly after solidification under actual hot tear-

ing conditions. Graphs and photographs. 8 ref. (Q27, CI)

207-Q. Mechanical Properties of Sand Cast Magnesium-Zinc-Zirconium Alloys. J. F. Hildebrand and F. P. Strieter. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 595-600; disc., p. 600-604.

Experiments to determine tensile strength, ductility, shear strength, bearing strength, and stress properties. Tables, graphs, and photographs. 19 ref. (Q23, Mg)

208-Q. Effect of Phosphorus Content on Graphitization Rate and Mechanical Properties of Black Heart Malleable Iron. J. E. Rehder. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 627-633; disc., p. 634.

Literature is reviewed and summarized. New data are provided. Tables, graphs, and micrographs. 13 ref. (Q general, N8, CI)

209-Q. Effect of Percentage of Nodular Graphite on Certain Mechanical Properties of Magnesium-Treated Cast Iron. R. W. Lindsay and A. Shames. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 650-654; disc., p. 654.

Melts were prepared by induction melting, and treated so that graphite structures in resulting castings varied from all flakes to practically all nodules. Double-treatment technique was used; Mg was added as an Fe-Si-Cu Mg alloy followed by a ferrosilicon addition. Graphs and micrographs. (Q general, E25, CI)

210-Q. Hot-Tear Formations in Steel Castings. U. K. Bhattacharya, C. M. Adams, and H. F. Taylor. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 675-680.

Tearing was produced in a flanged casting by placing restraining bars between the flanges. Degree of restraint was controlled by means of a gap in bar. Apparatus was devised to detect time and temperature at which cracking initiates in casting. Tables, diagrams, and photographs. 23 ref. (Q26, E11, CI)

211-Q. Mechanical Properties of Spherulitic Graphite Cast Iron. C. F. Reynolds and H. F. Taylor. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 687-713.

Purpose was to determine properties of new ferrous alloy, spherulitic cast iron, particularly effects of heat treatment and composition, and to indicate to what extent this material might prove of practical value for Ordnance material. Tables, graphs, diagrams, micrographs, and photographs. 364 ref. (Q general, T2, CI)

212-Q. Substitution of Boron for Alloys in Cast Steels. Ray A. Dyke, Jr. and C. K. Donoho. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 797-800; disc., p. 800-802.

Use of boron with respect to hardenability, recovery, fading, mechanical properties, and applications. Tables and graphs. (Q general, J26, CI)

213-Q. (French.) **Contribution to the Study of Criteria of Static Strength of Metallic Materials.** Louis Baes. *L'Ossature Métallique,* v. 17, Dec. 1952, p. 602-616.

A discussion of the fundamental diagram of a metal and the transposition of this diagram into Mohr coordinates or into principal normal stresses. Includes diagrams and photographs. (Q23)

214-Q. (German.) **Damping of Bending Vibrations in Thin Sheets by Firmly Adhering Coatings.** Hermann Oberst. *Akustische Beihefte,* no. 4, 1952, p. AB181-AB194.

Bending vibrations of thin sheet metal covered on one side by an adhesive layer of a damping material are treated theoretically. Measurements confirm theoretical results. Results of practical importance. Graphs. 6 ref. (Q8)

215-Q. The Alleviation of Thermal Stresses. E. W. Parkes. *Aircraft Engineering,* v. 25, Feb. 1953, p. 51-53.

Investigates dependence of thermal stresses in an aircraft structure upon the degree of insulation and rate of temperature change. Graphs. (Q25)

216-Q. Laterally Loaded Non-Uniform Struts. W. Gittleman. *Aircraft Engineering,* v. 25, Feb. 1953, p. 56-57.

Tabular method for finding bending moments which requires only arithmetical calculation. Tables and diagrams. (Q5)

217-Q. Summary of Progress on Studies of Stress Relaxation in Rail Steel and of Deformational Behavior of Rails. W. S. Hyler and H. J. Grover. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1249-1253.

Investigation aimed toward better understanding of shelling and detailed fractures in rails. Includes studies on stress-relaxation and deformation using low-carbon steel and Ag Cl. (Q25, CN)

218-Q. Stresses Around a Bolt Hole of a Rail With the Joint in Tension. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1254-1261.

Describes investigation. Photographs and tables. (Q25, CN)

219-Q. Wear Phenomena. F. T. Barwell. *Automobile Engineer,* v. 43, Feb. 1953, p. 77-80.

Effects of lubrication and nature of superficial layer. 15 ref. (Q9)

220-Q. Model to Illustrate the Behaviour of Fixed Base Portal Frames in the Plastic Range. M. R. Horne. *British Journal of Applied Physics,* v. 4, Feb. 1953, p. 54-55.

Model described reproduces modes of collapse of a fixed base steel portal frame as predicted by plastic theory. Quantitative agreement is obtained between observed and theoretical loads necessary for collapse. Diagrams. (Q23, ST)

221-Q. Mechanical Properties of Alloy Steels in Investment Castings. S. C. Churchill. *Engineering,* v. 175, Feb. 6, 1953, p. 164-167.

Investigation to analyze stress, tensile strength, and hardness of the castings. Micrographs and tables. (Q27, Q29, CI)

222-Q. Creep Properties of Steels for Power Plants. II. A. E. Johnson and N. E. Frost. *Engineering,* v. 175, Feb. 20, 1953, p. 249-250.

Three methods for computing normal stress and temperature-creep-strain-time curves. Graphs and tables. (Q3, ST)

223-Q. Tensile Properties of Nickel. *Industrial Heating,* v. 20, Feb. 1953, p. 244, 246, 248, 250.

Briefly describes series of tests. (Q27, Ni)

224-Q. A New High Temperature Alloy. M. N. Ornitz and R. H. English. *Iron and Steel Engineer,* v. 30, Feb. 1953, p. 102-112; disc., p. 112-117.

Evidence from field and laboratory tests is presented which demonstrates superiority of NA22H over commonly used commercial heat resistant alloys at temperatures from 1800-2200° F. Mechanical properties are tabulated. Tables, photographs, and graphs. 18 ref.
(Q general, Ni, Cr)

225-Q. The Nature of the Coefficients of Friction. J. T. Burwell and E. Rabinowicz. *Journal of Applied Physics,* v. 24, Feb. 1953, p. 136-139.

Sliding speed was found to influence friction force by the resulting shear strain rate around minute welded junctions. At higher speeds, friction force was also affected by the time required to form a full strength weld. (Q9)

226-Q. Autographic Load-Strain Recorders. A. Binns. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 166-168.

Brief general discussion on various types of recorders now in use. (Q27)

227-Q. Specification Creep Testing of Nimonic Gas-Turbine Alloys. C. W. Weaver. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 168-172.

Instrument developed to meet demand for short-time creep tests on materials for gas-turbine rotor blading and other high-temperature applications. (Q3, Ni)

228-Q. Crystal Fragmentation in Aluminium During Creep. D. McLean. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 287-292.

Seven specimens of super-pure Al having grain sizes of 1 to 9¼ grains per mm., were made to creep at 200° C. under loads varying from about ⅓ to ¾ ton per sq. in.; extensions produced ranged up to 50%. Observations and measurements were made relating to subcrystals formed. Tables. (Q3, N5. Al)

229-Q. Grain-Boundary Slip During Creep of Aluminium. D. McLean. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 293-300.

Grain-boundary displacements during creep at 200° C. were measured in seven super-pure Al specimens. Tests covered a range of grain size from 1 to 9¼ grains per sq. mm. and of stress from about ⅓ to about ¾ ton per sq. in. Graphs and micrographs. (Q3, Q24, Al)

230-Q. The Effect of Hydrogen on the Tensile Properties of Steel. J. D. Hobson and J. Hewitt. *Journal of the Iron and Steel Institute,* v. 173, Feb. 1953, p. 131-140.

Influence of microstructure, heat treatment, temperature, and rate of testing on hydrogen embrittlement of steel. Graphs and tables. 13 ref. (Q27, AY)

231-Q. Wear Studies of Irradiated Carbide Cutting Tools. B. Colding and L. G. Erwall. *Nucleonics,* v. 11, Feb. 1953, p. 46-49.

How isotope-tracer measurements, which are more accurate than microscopic examination, show a constant rate of tool wear. Use of Geiger-Muller and autoradiographic methods under normal machining conditions is emphasized. (Q9, C-n)

232-Q. New Stainless Stretches Nickel. Allen G. Gray. *Steel,* v. 132, Mar. 9, 1953, p. 94-97.

Compares new steel containing 1% Ni with Type 301. Strength, corrosion resistance, and fabricating properties. Photographs.
(Q general, R general, SS)

233-Q. Influence of Some Residual Elements and Their Neutralization in Magnesium-Treated Nodular Cast Iron. H. Morrogh. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 439-451; disc., p. 451-452.

Previously abstracted from *British Cast Iron Research Association of*

Research and Development; item 498-Q, 1952. (Q general, M27, CI)

234-Q. Amsler High-Frequency Torsional Vibrator of 2,000 KG. Type 2,000 HFT 423. *Bulletin de la Réunion des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions.* (English Ed.), July 1952, p. 17-21.

Uses, principle, source of current, static tests, device for combined flexure and torsion fatigue tests, photographic recording drum to determine internal damping of materials, and machine data. Photographs and diagram. (Q7, Q8)

235-Q. Creep and Relaxation Limits of Steels at Ordinary Temperature. F. Campus. *Bulletin de la Réunion des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions.* (English Ed.), Sept. 1952, p. 39-63.

Nature of test specimens; conditions of preliminary tests; arrangement of creep and relaxation measurements; creep and relaxation limits; and general observations. Graphs and diagrams. (Q3, ST)

236-Q. (Dutch.) **Metals for Use at High Temperatures in Electric Furnaces.** *Smit Mededelingen,* v. 7, Oct.-Dec. 1952, p. 149-154.

Mechanical properties and oxidation resistance of high-temperature steels and alloys. Data are tabulated and charted.
(Q general, R2, T5, SS, Ni, Cr, Si, Al)

237-Q. (Dutch.) **Methods and Apparatus for Control in Research.** A. Ph. Krijff. *Smit Mededelingen,* v. 7, Oct.-Dec. 1952, p. 154-157.

Describes a high-frequency direct-loading fatigue and creep testing apparatus. (Q3, Q7)

238-Q. (French.) **Contribution to the Study of the Strength of Gray Cast Iron.** Albert Collaud. *Von Roll Mitteilungen,* v. 11, July-Dec. 1952, p. 93-104.

A study was made of relationship of structure to dynamic behavior using unnotched bars. It is shown that gray iron can have considerable toughness. (Q23, CI)

239-Q. (German.) **Electron Microscopic Investigation of the Surface of Strained Super Purity Aluminum, I.** Heinz Wilsdorf and Doris Kuhlmann-Wilsdorf. *Zeitschrift für Angewandte Physik,* v. 4, Oct. 1952, p. 361-370.

New method of preparing Al specimens with strains between 0.5 and 64%. This investigation showed a very finely stepped structure outside slip bands for which the designation "elementary structure" was proposed. Development of slip bands is described on basis of electron micrographs and slip-band counts. Micrographs. 13 ref. (Q24, M21, Al)

240-Q. (German.) **Complete Determination of Residual Stresses in Hollow Metallic Cylinders.** H. Bühler and W. Schreiber. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Dec. 11, 1952, p. 1147-1151.

Method by which electric strain gage can be applied to above. Examples of testing brass and steel. Formulas for calculation of residual stress components. Graphs. 19 ref. (Q25, CN, Cu)

241-Q. Influence of Testing Frequency on the Fatigue Strength of Steels and Light Alloys. Th. Wyss. *ASTM Bulletin,* Feb. 1953, p. 31-34.

Fatigue strength for 1 million cycles was determined for different grades of carbon and alloy steel at 350 and 10,500 c.p.m. and for various light alloys at 350 and 8000 c.p.m. Tests were carried out under fluctuating axial tensile stress and zero minimum stress. Short description of equipment used and its influence upon results obtained. Tables. (Q7. CN, AY. Al, Mg)

242-Q. Aluminum Alloy Test Bars. Their Meaning, Production, and Testing. D. L. LaVelle. *Engineering Experiment Station News* (Ohio State University), v. 25, Feb. 1953, p. 19-23, 54-58.

What test bars are; what they do; what they denote; how they should be made, tested, and heat treated; and what to look for in bad bars. Photographs and diagrams. (Q27, Al)

243-Q. Cutting Tool Wear. W. Spaeth. *Industrial Diamond Review,* v. 13, Feb. 1953, p. 39-43.

Life tests of cutting tools can be used to determine individual properties of materials for workpiece and tools.
(Q9, S21, TS, SG-j)

244-Q. Inelastic Instability and Incremental Theories of Plasticity. E. T. Onat and D. C. Drucker. *Journal of the Aeronautical Sciences,* v. 20, Mar. 1953, p. 181-186.

Shows that incremental plasticity theory leads to proper results when unavoidable initial imperfections of shape are considered. Diagrams and graphs. 11 ref. (Q23)

245-Q. Residual Stresses Introduced During Metal Fabrication. Kent R. van Horn. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 405-422.

Beneficial and injurious effects of these stresses are presented in a qualitative and quantitative manner. Examples from commercial experi-

ence illustrate location of residual stresses and practical effects which they introduce. Brass, Al, and steel were used. Photographs and graphs. 38 ref. (Q25, Cu, Al, ST)

246-Q. Directional Properties of 2S Aluminum. K. T. Aust and F. R. Morral. *Journal of Metals,* v. 5, Mar. 1953; *Transactions of American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 431-436.

Preferred orientation and earing characteristics of 2S Al were studied. Empirical correlation was obtained relating earing behavior and mechanical properties for face-centered cubic metals. Strain-ratio measurements for 2S were found to be in agreement with Hill's theory of plastic anisotropy. Photographs and graphs. (Q24, Al)

247-Q. The Fatigue Properties of Z-Section Test Pieces Completely Machined From an Aluminium Alloy Extrusion Conforming to D.T.D. 364B. G. Forrest, K. W. Gunn, and A. R. Woodward. *Journal of the Royal Aeronautical Society,* v. 57, Feb. 1953, p. 103-107.

A detailed account of the testing technique. Diagrams and photographs. (Q7, Al)

248-Q. The Bending of Some Common Beam Sections Into the Plastic Range. Anthony J. Barrett. *Journal of the Royal Aeronautical Society,* v. 57, Feb. 1953, p. 110-115.

Examines problem by using an accurate mathematical form for stress-strain curve, strain and bending moments being expressed as functions of ratios of various properties of material. Value of maximum permissible fiber stress is considered in relation to current requirements for military aircraft stressing. A guide is presented for maximum permissible bending moment in beam cross sections bending about an axis of symmetry. Graphs and diagrams. (Q5)

249-Q. Investigations of the Behaviour of Metal and Plastic Slides. *Machinery* (London), v. 82, Feb. 27, 1953, p. 405-409.

Lubrication of sliding surfaces; tests on cast iron and laminated plastic slideways; "stick-slip" vibration in machine tools; friction of cast iron with different lubricants; properties of polytetrafluorethylene and other plastics; surface finish; and improved lubricants. Graphs. (Q9, CI)

250-Q. How to Make Die Springs Last Longer. *Mainspring,* v. 14, Feb. 1953, unpaged.

Investigates stress conditions under which die springs operate in order to prevent spring failures. Includes formulas for designing rectangular wire springs. (Q25, T7)

251-Q. The Effect of Initial Curvature on the Strength of an Inelastic Column. Thomas W. Wilder, III, William A. Brooks, Jr., and Eldon E. Mathauser. *National Advisory Committee for Aeronautics,* Technical Note 2872, Jan. 1953, 17 pages.

Reduction in column strength due to initial curvature is determined theoretically for a pin-ended, idealized, inelastic H-section column. Equations relating load and lateral deflection permit a systematic variation in parameters representing stress-strain properties, column proportions, and initial curvature of column. Graphs. (Q23)

252-Q. The Effect of Longitudinal Stiffeners Located on One Side of a Plate on the Compressive Buckling Stress of the Plate-Stiffener Combination. Paul Seide. *National Advisory Committee for Aeronautics,* Technical Note 2873, Jan. 1953, 66 pages. (Q28)

253-Q. On Traveling Waves in Beams. Robert W. Leonard and Bernard Budiansky. *National Advisory Committee for Aeronautics,* Technical Note 2874, Jan. 1953, 76 pages.

Basic equations of Timoshenko for motion of vibrating nonuniform beams are presented in several forms, including one in which equations are written in directions of characteristics. Propagation of discontinuities in moment and shear, as governed by these equations, is discussed. Diagrams and graphs. (Q2)

254-Q. Behavior in Pure Bending of a Long Monocoque Beam of Circular-Arc Cross Section. Robert W. Fralich, J. Mayers, and Eric Reissner. *National Advisory Committee for Aeronautics,* Technical Note 2875, Jan. 1953, 33 pages.

Analysis is made of pure bending moment of a thin, infinitely long, pure-monocoque beam having a constant, doubly symmetric, circular-arc cross section. Bending moments, deflections, and stresses are obtained. Analysis shows a nonlinear behavior in bending which leads ultimately to a maximum moment and instability. Diagrams. (Q5)

255-Q. Bearing Strengths of Some 75S-T6 and 14S-T6 Aluminum-Alloy Hand Forgings. E. M. Finley. *National Advisory Committee for Aeronautics,* Technical Note 2883, Jan. 1953, 24 pages.

Investigation to determine bearing and utensile properties in longitudinal and transverse directions.

Ratios of bearing to tensile properties were determined. Graphs, diagrams, photographs, and tables. (Q27, Q9, Al)

256-Q. Calculation and Measurement of Normal Modes of Vibration of an Aluminum-Alloy Box Beam With and Without Large Discontinuities. Frank C. Smith and Darnley M. Howard. *National Advisory Committee for Aeronautics,* Technical Note 2884, Jan. 1953, 40 pages.

Lowest normal modes of vibration of three beams were calculated using a matrix iteration method. Experimental and calculated data are compared. Experimental measurements were limited at higher frequencies by local vibrations of small elements of beams. Graphs and tables. (Q23, Al)

257-Q. On the Statistical Interpretation of Fatigue Tests. A. M. Freudenthal and E. J. Gumbel. *Proceedings of the Royal Society,* v. 216, ser. A, Feb. 10, 1953, p. 309-332.

Statistical theory of extreme values can be applied to interpretation of observed frequencies of survival at any stress amplitude. Graphs and tables. 20 ref. (Q7)

258-Q. Structural Changes During the Fatigue of Metals. F. P. Bullen, A. K. Head, and W. A. Wood. *Proceedings of the Royal Society,* v. 216, ser. A, Feb. 10, 1953, p. 332-343.

X-ray diffraction and metallographic examinations of a metal subjected to cyclic stressing. Micrographs. 15 ref. (Q7)

259-Q. Three Years' Experience With a New Micro-Abrasion Tester. P. Grodzinski. *Research,* v. 6, Mar. 1953, p. 98-105.

Experiences gained from abrasion tester designed to determine wear over a small volume of specimen. Graphs, diagrams, and photographs. 17 ref. (Q9)

260-Q. (French.) **Relation Between the Fatigue and Plastic Deformation of Steels.** A. Fotiadi. *Métaux Corrosion-Industries,* Nov. 1952, p. 425-445.

Reactions of quenched and tempered steels to external forces. Simple phase (ferritic or austenitic) and aggregate structures were used. Diagrams. (Q7, Q24, SS)

261-Q. (French.) **Structural Changes of Aluminum During Creep.** G. Wyon and C. Crussard. *Métaux Corrosion-Industries,* Nov. 1952, p. 446-457.

Experimental data and results. Micrographs. 14 ref. (Q3, Al)

262-Q. (French.) **Influence of Addition Elements on the High Temperature Behavior of Magnesium Alloys.** Jean Gris. *Métaux Corrosion-Industries,* Nov. 1952, p. 458-462.

Effects on cast and wrought alloys. Properties are compared. Tables, graphs, and charts. (Q general, Mg)

263-Q. (Spanish.) **Collaboration of the Shipyards in the Study of Steel Brittleness.** Antonio Villanueva Nunez. *Ciencia y Tecnica de la Soldadura,* v. 11, Sept.-Oct. 1952, 14 pages.

Anisotropy of rolled steel in impact tests, welding of aging steels, and the Schnadt test in selection of steel for welded ships. Tables and diagrams. (Q23, K9, CN)

264-Q. (Book.) **Studies in Elastic Structures.** A. J. S. Pippard. 361 pages. 1952. Edward Arnold, 41 Maddox St., London W.1, England. 60s.

Stresses in circular rings, wheels, braced rings, rotating wheels, interconnected bridge girders, multiple lattice frames, cable bracing, restrained pipe lines, and braced tube. Analysis of open panel structures, bow girders, and transversely loaded frames are included. (Q21)

265-Q. The Peeling Test on Redux-Bonded Joints. A Theoretical Analysis of the Test Devised by Aero Research Limited. C. J. Spies. *Aircraft Engineering,* v. 25, Mar. 1953, p. 64-70.

Analyzes stresses in bonded part of the strip, deformation of the free part, and sensitivity of the peeling test. Graphs and diagrams. (Q25, K12)

266-Q. Elements in the Cause and Cure of Residual Stresses in Cast Iron. L. A. Aldinger. *American Foundryman,* v. 23, Mar. 1953, p. 77-78.

Brief discussion. Micrographs. (Q25, CI)

267-Q. Photoelastic Determination of Stresses in a Cylindrical Shell. H. Fessler and R. T. Rose. *British Journal of Applied Physics,* v. 4, Mar. 1953, p. 76-79.

Frozen stress photo-electric technique was used to determine surface stresses and deformations of a cylinder with flat disk head under internal pressure. Technique of casting, machining, freezing, and slicing of the models. Graphs. 9 ref. (Q25)

268-Q. New Tester Accurately Checks Drawability of Sheet Steel. W. G. Patton. *Iron Age,* v. 171, Mar. 19, 1953, p. 143-145.

Scientific test to determine drawing qualities of flat-rolled stock. Tester evaluates stretcher strains and detects progressive effects of aging. Graphs and photographs. (Q23, CN)

269-Q. Stress-Cracking of Copper by Mercury. J. Neill Greenwood. *Journal of the Institute of Metals,* v.

81, Mar. 1953; *Bulletin of the Institute of Metals,* v. 1, Mar. 1953, p. 177-178.

Describes tests on Cu subjected to approximately constant rates of tensile strain of 0.2, 40, and 1000% per hr. at room temperature. Micrographs. (Q27, Cu)

270-Q. Aluminum Alloy Family Gets New Quartet. *SAE Jounrnal,* v. 61, Mar. 1953, p. 65-67.

An abridgement of "Today's Aluminum Aircraft Alloys" by J. A. Nock, Jr. Describes new Al alloys and compares mechanical properties. How they can be used for structures, cladding, and rivets. (Q general, T7, T26, Al)

271-Q. Notch Impact Tests of Weld Metal At Low Temperatures. M. Lefevre and J. Lemoine. *Welding Journal,* v. 32, Mar. 1953, p. 122s-124s.

Extended abstract by G. E. Claussen from *Arcos,* Apr. 1952, p. 3171-3189. Transition temperature based on a criterion of minimum energy with a round notch Charpy specimen was determined for weld metal deposited by four different covered electrodes. Graphs. (Q6, K1)

272-Q. On the Problem of the Wear Resistance of Chromized Surfaces. N. S. Gorbunov and V. P. Lazarev. Henry Brutcher Translation 2966, 3 pages.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 33-Q, 1953. (Q9, Q29, Fe, Cr)

273-Q. (French.) **Deterioration of Tools Used Under Pressure in the Foundry.** R. Grunberg. *La Métallurgie et la Construction Mécanique,* v. 84, Dec. 1952, p. 923, 925-927.

Pressure and shock of metal; heat shock; chemico-physical action and erosion by liquid metal; and influence of shrinkage. (Q general, E general)

274-Q (French.) **Spreading and Detection of Fatigue Cracks.** R. Cazaud. *Métaux Corrosion-Industries,* v. 27, Dec. 1952, p. 475-485.

Micrographic and radio crystallographic studies were made on crack detection. Rate and direction of cracking are discussed. 19 ref. (Q7)

275-Q. Structural Strength of Thin-Walled Channel Sections. J. M. Harvey. *Engineering,* v. 175, Mar. 6, 1953, p. 291-293.

Theoretical analysis of local instability conditions under flexure in structural sections. Graphs. (Q23)

276-Q. Low-Temperature Test Chamber. *Engineering,* v. 175, Mar. 13, 1953, p. 332-333.

Use of equipment which makes tensile, compression, fatigue, hardness, or impact tests at subzero temperatures. Photographs. (Q general)

277-Q. Temper-Brittleness. A Critical Review of the Literature. B. C. Woodfine. *Journal of the Iron and Steel Institute,* v. 173, Mar. 1953, p. 229-240.

Survey of the published work on temper brittleness up to 1952. Summarizes various theories which have been proposed to explain temper brittleness. Graphs. 77 ref. (Q23)

278-Q. Twisted Square Plate Method and Other Methods for Determining the Shear Stress-Strain Relation of Flat Sheet. Walter Ramberg and James A. Miller. *Journal of Research of the National Bureau of Standards,* v. 50, Feb. 1953, p. 111-123.

Method requires measurements of deflection or extreme fiber bending strain in center portion of a twisted square plate. Examination of alternate methods indicates particular promise for use of an annulus of constant thickness. Al and mild steel were used in the experiments. Diagrams. 17 ref. (Q2, Al, CN)

279-Q. Stress-Strain Relation in Shear From Twisting Test of Annulus. Walter Ramberg and James A. Miller. *Journal of Research of the National Bureau of Standards,* v. 50, Feb. 1953, p. 125-130.

Tests were made on 0.032-in. 75S-T6 Al alloy sheet stressed well beyond the elastic range. Diagrams and photographs. (Q2, Al)

280-Q. Stress Analysis of Circular Frames in a Non-Tapering Fuselage. K. J. Dallison. *Journal of the Royal Aeronautical Society,* v. 57, Mar. 1953, p. 151-176.

Approximate method for analysis of frames using Lagrange's method for minimizing a function of several interdependent variables. Diagrams and graphs. 14 ref. (Q25)

281-Q. How to Evaluate High Temperature Performance of Materials. L. B. Pfeil. *Materials & Methods,* v. 37, Mar. 1953, p. 79-84.

Creep, fatigue, corrosion resistance, and thermal shock as properties to consider in judging materials. Graphs and photographs. 25 ref. (Q3, Q7, R general)

282-Q. Designing With Aluminum. E. J. deRidder. *Modern Metals,* v. 9, Mar. 1953, p. 58-60, 64-65.

How to achieve weight savings with Al at no sacrifice in strength. Diagrams. (Q23, Al)

283-Q. The Effect of Temperature on the Rolling Texture of Plastically Deformed Low Carbon Steel Strip. Norman P. Goss. *Transactions of the*

American Society for Metals, v. 45, 1953, p. 333-340; disc., p. 341-343.

Samples were rolled at temperatures from 32 to 800° F. Variables such as number of passes and total reduction were kept constant. X-ray diffraction patterns were taken by the reflection method transverse to the rolling direction. Intensity minima and maxima were measured with a microphotometer. Graphs. 6 ref. (Q24, CN)

284-Q. The Role of Anelasticity in Creep, Tension, and Relaxation Behavior. J. D. Lubahn. *Transactions of the American Society for Metals,* v. 45, 1953, p. 787-838.

Experiments using Cr-Mo-V steel which show that creep recovery exhibits same behavior characteristics as anelastic deformation. Graphs. 11 ref. (Q22, Q3, Q27, AY)

285-Q. (English.) **An Abnormal After-Effect in Metals.** Charles S. Barrett. *Acta Metallurgica,* v. 1, Jan. 1953, p. 2-7.

Experiments showed that single and polycrystalline Fe and Zn wires subjected to plastic flow in torsion generally untwist at a rate such that equal strains occur in equal intervals of log time. Graphs. 18 ref. (Q24, Fe, Zn)

286-Q. (English.) **Plastic Deformation of Alpha-Uranium; Twinning and Slip.** R. W. Cahn. *Acta Metallurgica,* v. 1, Jan. 1953, p. 49-70.

Data on crystallography of twinning, slip, and kinking in α-uranium. Discusses observed intersections of twins and their application to the confirmation of twin directions. Observations are discussed in relation to the crystal structure of U. Atomic motions in twinning are derived graphically. Diagrams and micrographs. 35 ref. (Q24, U)

287-Q. (English.) **A Note on Twinning in Alpha-Uranium.** F. C. Frank. *Acta Metallurgica,* v. 1, Jan. 1953, p. 71-74.

Compares twinning modes of α-uranium with those of Zn. Crystal structures and reciprocal shears and twinning modes. (Q24, U, Zn)

288-Q. (English.) **Similar Glide Processes in Ionic and Metallic Crystals.** P. L. Pratt. *Acta Metallurgica,* v. 1, Jan. 1953, p. 103-104.

Experiments to study plastic deformation of NaCl single crystals. 10 ref. (Q24)

289-Q. (Dutch.) **Effects of Strain in Artificial Aging of Steel.** F. Van Wijk. *Metalen,* v. 8, Jan. 15, 1953, p. 1-4.

Pieces of steel plate were strained 0, 1, 2, 3, 5, and 10% in tension before cutting impact specimens and aging at 250° C. Tests were made at 20, 0, −20, and −40° C. Data are tabulated and charted. 2 ref. (Q6, J27, CN)

290-Q. (French.) **Long-Duration Room-Temperature Tensile Test of Tin Alloy Notched Specimens.** W. Siegfried. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 115-135; disc., p. 135.

Accuracy and advantages. Micrographs, graphs, and tables. (Q27, Sn)

291-Q. (French.) **Study of the Influence of Oxygen-Cutting on Fatigue Strengths of Steel Plate.** H. de Leiris and M. Ballet. *Soudure et Techniques Connexes,* v. 6, Nov.-Dec. 1952, p. 271-279.

Residual stresses caused by oxygen cutting of steel plate were determined. Fatigue data and specimen structures are included. (Q25, Q7, G22, ST)

292-Q. (German.) **Friction, Friction Oxidation, and Fatigue Cracking of Metals.** W. Spath. *Metall,* v. 7, Jan. 1953, p. 34-36.

If two metallic surfaces are moved against one another under pressure, high local temperature occurs which can momentarily reach the melting temperature of the metals. Friction oxidation is signified by galling of local areas and subsequent shearing. Fatigue cracking is explained by combined effect of destructive "melting-off process" and healing of welds. (Q7, Q9)

293-Q. (German.) **Change of the Mechanical Physical Properties of Ag-Cu Alloys by Addition of Phosphorus.** F. Lihl and J. Bengough. *Metall,* v. 7, Feb. 1953, p. 103-106.

Properties of Ag-rich Ag-Cu-P alloys were tested. Addition of P favored increased hardness, elasticity, and plastic deformation but showed no increase in electrical conductivity. Photographs, tables, and graphs. (Q general, P15, Ag, Cu)

294-Q. (German.) **Experiences With Additions of Boron to Structural Steel Alloys.** Helmut Krainer and Max Kroneis. *Stahl und Eisen,* v. 72, Dec. 18, 1952, p. 1652-1657.

Influence of B on hardenability and hardness properties was tested for various structural steels. Graphs and micrographs. 13 ref. (Q29, J26, AY)

295-Q. (German.) **Electron Microscopic Investigation of the Surface of Strained Super Pure Aluminum. Parts II and III.** Heinz Wilsdorf and Doris Kuhlmann-Wilsdorf. *Zeitschrift für Angewandte Physik,* v. 4, Nov. 1952, p. 409-424.

Discusses a number of disturbances and effects of plastic deformation. All cross-slip lines observed

belong to the (111) system. Measurement of thickness and average slip of lamina in cross slips is emphasized. (Q24, Al)

296-Q. (German.) **Processes in Stressed and Alternatingly Stressed Metallic Structures. Part IV. Internal Notch Effect and Surface Sensitivity With an Alternating Bending Load.** Cord Petersen. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 429-433.

Quantitative standards are set up for a general theory on the effects of internal notches in cast steel, cast iron, and hardened steels. Surface sensitivity in bending and internal notches are shown to be similar phenomena. (Q5, ST, CI)

297-Q. A Preliminary Study of the Ductility of Chromium. H. B. Goodwin, R. A. Gilbert, C. M. Schwartz, and C. T. Greenidge. *Electrochemical Society Journal,* v. 100, Apr. 1953, p. 152-160.

Chromium was found to be cold ductile if it is sufficiently pure and if low strain rates are used. Slip mechanism was confirmed by X-ray and microscopic techniques. Micrographs. 9 ref. (Q23, Cr)

298-Q. Effect of Low and High Temperatures on Physical Properties and Machinability of Carbon Steels. F. Bögner. (Translated and condensed from *Die Technik,* v. 7, Nov. 1952, p. 667-672.) *Engineers' Digest,* v. 14, Mar. 1953, p. 87-90.

Effect of temperature on mechanical properties of materials and machinability criteria.
(Q general, G17, CN)

299-Q. Surface Effects and the Creep of Zinc Single Crystals. I. Creep Characteristics of Clean and Oxide-Coated Crystals. Frances Dunkle Coffin and Andrew L. Weiman. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 282-289.

Quantitative studies of the influence of surface composition on creep under constant loads. Graphs and tables. 12 ref. (Q3, Zn)

300-Q. Elasticity and Thermal Expansion of Germanium Between −195 and 275° C. Morris E. Fine. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 338-340.

Calculations of the elastic parameters, compressibility, and Poisson's ratio. Graphs. 12 ref. (Q21, P11, Ge)

301-Q. Limiting Conditions for Jet Formation in High Velocity Collisions. J. M. Walsh, R. G. Shreffler, and F. J. Willig. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 349-359.

Discusses high-velocity collision of two solids as a problem in compressible fluid hydrodynamics. Presents a theory which describes flow in the collision region for the jetless case and determines a critical collision angle above which a jet must arise from the collision. Graphs, diagrams, and photographs. (Q general, CN, Cu, Pb)

302-Q. Magnesium Casting Alloys Containing Zirconium. F. P. Strieter. *Metal Progress,* v. 63, Mar. 1953, p. 75-82.

Physical and mechanical properties of Mg-rare earth-Zr, Mg-Th-Zr, and Mg-Zn-Zr systems. Graphs and tables. (Q general, Mg)

303-Q. Some Metallurgical Characteristics of Medium-Carbon Boron-Treated Steels. Robert N. Imhoff and James W. Poynter. *Metal Progress,* v. 63, Mar. 1953, p. 97-104.

Tests for quenching temperature, hardenability, tensile properties, notched tensile strength, notched impact values, temper brittleness, and fractures. Tables and graphs.
(Q general, J26, AY)

304-Q. Fatigue Properties of Springs as Affected by Heat Treatment. R. L. Rickett and A. O. Mason. *Metal Progress,* v. 63, Mar. 1953, p. 107-110.

Fatigue test procedure and test results on austempered and quenched and tempered springs. Graphs and tables. (Q7, J26, SG-b)

305-Q. A Linear Time-Temperature Relation for Extrapolation of Creep and Stress-Rupture Data. S. S. Manson and A. M. Haferd. *National Advisory Committee for Aeronautics,* Technical Note 2890, Mar. 1953, 49 pages.

Sources of discrepancy from the use of (T+460) (20+log+,) parameter and proposes use of two newly derived material constants. Graphs. (Q3, Q4)

306-Q. Effect of Processing Variables on the Transition Temperature, Strength, and Ductility of High-Purity, Sintered, Wrought Molybdenum Metal. Kenneth C. Dike and Roger A. Long. *National Advisory Committee for Aeronautics,* Technical Note 2915, Mar. 1953, 26 pages.

Emphasizes amount of swaging, recrystallization, and stress-relieving. (Q23, F25, N5, J1, Mo)

307-Q. A Wear-Resisting Iron. *Overseas Engineer,* v. 26, Apr. 1953, p. 298-299.

Applications for C. Y alloy which has a homogeneous, tough structure with high anti-abrasion properties. Photographs.
(Q9, T general, CI)

308-Q. Creep Testing in Compression for Simple Creep Assessment. A.

H. Sully. *Product Engineering,* v. 24, Apr. 1953, p. 150-153.

Apparatus and correlation between compressive and tensile creep. (Q3)

309-Q. Improving Fatigue Resistance of Bolted Joints. J. P. Vidosic. *Product Engineering,* v. 24, Apr. 1953, p. 190-191.

Tabulated information. (Q7, K13)

310-Q. Using SR-4 Gages to Measure Strains in Wire Strand. A. Smislova, A. C. Loewer, Jr., and W. J. Eney. *Product Engineering,* v. 24, Apr. 1953, p. 214.

Briefly describes technique. (Q25)

311-Q. Critical Buckling Shear Stresses in Thin Cylinders. J. J. Eden. *Product Engineering,* v. 24, Apr. 1953, p. 225, 227.

Mathematical interpretation. Nomographs. (Q2)

312-Q. A Machine for Tensile Testing at Controlled Temperatures and Constant True Strain Rates. E. L. Bartholomew, Jr., K. J. Krystyan, D. A. J. Millar, and J. Wulff. *Review of Scientific Instruments,* v. 24, Mar. 1953, p. 196-202.

Details of construction and operation of the equipment. Information obtainable is valuable in hot working research and complements that available from creep and stress-rupture tests. Diagrams and graphs. (Q27)

313-Q. Hardness and Hardenability. Howard E. Boyer. *Steel Processing,* v. 39, Feb. 1953, p. 78-82.

Defines and explains both terms. (Q29, J26)

314-Q. On the Physical Nature of Fatigue. L. A. Glikman and V. P. Tekht. Henry Brutcher Translation 2983, 4 pages. (From *Doklady Akademii Nauk SSSR,* v. 86, no. 4, 1952, p. 699-701.)

Experimental study based on mechanical tests and X-ray investigation. Changes in fatigue strength and X-ray pattern of medium carbon and 14% Cr stainless steel upon repeated cyclic stressing above and below the fatigue limit, with and without subsequent aging or high tempering. (Q7, CN, SS)

315-Q. (English.) **Yield Points in Aluminium Alloy Single Crystals.** R. E. Smallman, G. K. Williamson, and G. Ardley. *Acta Metallurgica,* v. 1, Mar. 1953, p. 126-130.

Experiments were made to compare tensile behavior of some Al alloy single crystals which contained Cu, Zn, or H_2, with that of superpure Al crystals. Graphs. 22 ref. (Q27, Al, Cu, Zn)

316-Q. (English.) **Anelastic Measurement of Atomic Mobility Under Non-Equilibrium Conditions.** A. S. Nowick and R. J. Sladek. *Acta Metallurgica,* v. 1, Mar. 1953, p. 131-140.

Anelastic method is used to measure mobility in Ag-Zn alloys after quenching-in an excess of vacancies. Graphs. 13 ref. (Q22, M25, Ag, Zn)

317-Q. (English.) **The Internal Friction of Tantalum and Columbium Foils at Ultrasonic Frequencies.** J. W. Marx, G. S. Baker, and J. M. Sivertsen. *Acta Metallurgica,* v. 1, Mar. 1953, p. 193-201.

Tests for determining temperature dependence of the internal friction of polycrystalline Ta and Cb foils. Graphs and diagrams. 20 ref. (Q22, Ta, Cb)

318-Q. (English.) **The Movement of Twins, Kinks, and Mosaic Walls in Zinc.** P. L. Pratt and S. F. Pugh. *Acta Metallurgica,* v. 1, Mar. 1953, p. 218-222.

Movement under stress of kink planes and curved mosaic walls in terms of their dislocation content. Micrographs. 9 ref. (Q24, Zn)

319-Q. (English.) **Textures in Extruded Aluminium.** K. V. Gow and R. W. Cahn. *Acta Metallurgica,* v. 1, Mar. 1953, p. 238-241.

Shows that the preferred orientation of nuclei must aid in determining the final texture. Diagrams. (Q24)

320-Q. The Theory of Indentation and Hardness Tests. R. F. Bishop, R. Hill, and N. F. Mott. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 1-16.

Indentation of ductile materials by cylindrical punches with conical heads. Experiments made with work hardened and with annealed Cu, for penetrations up to nine times the diameter of the punch. Graphs. (Q29, Cu)

321-Q. The Theory of Wedge Indentation of Ductile Materials. R. Hill, E. H. Lee, and S. J. Tupper. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 17-35.

Theoretical solution for the deformation produced by a rigid frictionless wedge penetrating a plastic material. Theory is compared with results of experiments on Pb blocks indented by steel wedges coated with Vaseline. Diagrams and photographs. (Q25, Pb)

322-Q. The Theory of Wedge Penetration at Oblique Incidence and Its

Application to the Calculation of Forces on a Yawed Shot Impacting on Armour Plate at Any Angle. R. Hill and E. H. Lee. "Strength & Testing of Materials". v. 6, Part I. Theoretical Papers on Strength and Deformation. 1952. p. 36-46.

Methods and applications. Tables and diagrams. (Q25)

323-Q. The Theory of Combined Plastic and Elastic Deformation with Particular Reference to the Deformation of a Thick Tube Under Internal Pressure. E. H. Lee, R. Hill, and S. J. Tupper. "Strength & Testing of Materials". v. 6, Part I Theoretical Papers on Strength and Deformation. 1952. p. 47-76.

Reviews theory of the deformation of a material under combined stresses, which involves both elastic and plastic components of strain. Applications of theory. Diagrams and graphs. (Q24)

324-Q. The Theory of the Autofrettage of a Closed-End Tube. R. Hill, E. H. Lee, and S. J. Tupper. "Strength & Testing of Materials". v. 6. Part I, Theoretical Papers on Strength and Deformation. 1952. p. 77-87.

As plastic flow develops, longitudinal strain increases toward a limit which is very nearly attained not long after the whole tube is entirely plastic. Conventional treatment is found to be more accurate for a closed-end condition than it is when longitudinal strain is prevented. Graphs. (Q24)

325-Q. A Method of Numerical Solution of the General Plane Plastic Problem, and Its Application to the Compression of a Ductile Material Between Rough Plates. R. Hill, E. H. Lee, and S. J. Tupper. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 88-104.

Procedures and results. Diagrams and graphs. (Q28)

326-Q. Notch Brittleness and Ductile Fracture in Metals. E. Orowan, J. F. Nye, and W. J. Cairns. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 127-176.

Cause of notch brittleness according to the Ludwik-Davidenkov theory. X-ray investigations show that it may also arise in an entirely different way and that, in ductile carbon steels, the upper yield point can rise considerably above its value under uniformly distributed stress. Graphs, diagrams, and tables. 38 ref. (Q23)

327-Q. The Two-Dimensional Theory of Plastic Yielding of Deeply-Notched Bars in Tension. R. Hill. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 177-190.

Analysis of stress distribution in the core of a notched bar under tension at stage when bar is about to yield. Results obtained are roughly of the same magnitude as those found experimentally for round bars. Diagrams. (Q27)

328-Q. A Theoretical Analysis of the Stresses and Strains in Wire-Drawing. R. Hill and S. J. Tupper. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 205-224.

Proposes new theory to describe stress distribution in a wire drawn through a die. Shape of plastic region is determined by considering the associated strain configuration. Diagrams and graphs. 13 ref. (Q25, F28)

329-Q. General Methods of Solution of the Axially Symmetric Problem in Plasticity. R. Hill. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 225-246.

Various methods for solving axially symmetric problems in the plastic flow of metals under large strains. Applications to necking of a tensile specimen, wiredrawing, triaxial stresses in a tube, and indentation by a flat punch. 8 ref. (Q24)

330-Q. A Theory of the Yielding and Plastic Flow of Anisotropic Metals. R. Hill. "Strength & Testing of Materials". v. 6. Part I. Theoretical Papers on Strength and Deformation. 1952. p. 247-260.

Application of theory to experiments on necking under uniaxial tension of flat bars cut from rolled sheet. Diagrams. 8 ref. (Q24, Q27)

331-Q. A Nomographic Solution of a Stress Problem. D. E. Thomas. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 1-6.

Complete determination of stress involves the determination of the magnitude and direction of the principal stresses. Method of solving the equations involved. (Q25)

332-Q. Measurement of Stress by X-Rays. D. E. Thomas. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 7-18.

Direct and oblique back-reflection; effects of stress on back-reflection; detection of circumferential and radial stresses in a ring; and determination of elastic constants. Graphs and photographs. 9 ref. (Q25)

333-Q. The Relationship Between Required Test Factors and Strength Variation. R. D. Starkley and D. R. Cox. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 19-30.

Probability curves from which the test factor corresponding to any given scatter and level of probability may be found. Method of using the curves and some of their applications. Graphs. (Q23, S12)

334-Q. The Relationship Between Required Test Factors and Strength Variation in the Case of Two Types of Failure. D. R. Cox. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 31-38.

Methods, calculations, and conclusions. Graphs. (Q23)

335-Q. The Effect of Skewness of the Frequency Distribution on the Relationship Between Required Test Factors and Strength Variation. D. R. Cox. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 39-49.

Investigation of theory and applications. Graphs. (Q23)

336-Q. Mechanical Methods of Measuring Internal Stress. Split Ring Method as Applied to a Cold Drawn Cylindrical Cup. A. Knight and H. E. Morgan. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 50-60.

Methods and tests. Graphs, tables, and photographs. (Q25)

337-Q. Bearing Tests on Tube, Bar, and Sheet Materials. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 61-120.

Tests carried out on typical joints. Test pieces were designed so that the average tensile and shear stresses in the material around the holes were small in comparison with the average bearing stresses. Graphs, tables, and photographs. (Q23)

338-Q. Investigation of Butt-Welds in Low-Carbon Steel Tubes". "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952, p. 125-139.

Investigation of fatigue strength under alternating bending stress, and static tensile strength of butt welded tubes not subsequently heat treated, and of welded tubes which were blued and normalized after being welded. Graphs, tables, and micrographs. (Q7, K9, CN)

339-Q. Investigations of Butt-Welds in Low-Carbon Low-Manganese Steel. J. M. Robertson and C. W. George. "Strength & Testing of Materials". v. 6, Part II. Testing Methods and Test Results. 1952. p. 140-153.

Tensile and fatigue tests on tubes in the "as-received" condition and after butt welding at midlength by oxy-acetylene torch, the welds having been made with iron wire as filler rod. Graphs and tables. (Q27, Q7, CN)

340-Q. Investigation of Butt-Welds in Chromium-Molybdenum Steel. H. J. Hipkins and W. J. Taylor. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 154-175.

Effect of building up an oxy-acetylene butt-weld in tubing to increase the diameter by 0.04 in. Effects of three heat treatments applied after the welding operation. Graphs, tables, and micrographs. (Q general, K2, J1, AY)

341-Q. The Mechanical Properties of Butt-Welded Joints in Chromium-Molybdenum Steel Tubing, D.T.D. 178. M. S. Fisher and J. T. Ballett. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 176-188.

Tensile tests and rotating-beam fatigue tests made on tubing as received and with the outer surface ground smooth. Gaswelded butt joints were tested as-welded and with the external reinforcement machined off. Tables. (Q27, Q7, K2, AY)

342-Q. Strength Requirements for Spot Welds. D. R. Cox, P. E. Montagnon, and R. D. Starkey. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 189-200.

Failure rates for spot welded joints. Test factors that should be required are estimated. Graphs. (Q27, K3)

343-Q. Investigation of the Effect of Welding on the Mechanical Properties of Low-Carbon Manganese-Molybdenum Steel Tubing (D.T.D. 347). M. S. Fisher. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 201-206.

Test data on effect of simple heat treatment; oxy-acetylene and metallic-arc welding, and heat treatment

after welding on tensile properties and fatigue strength. (Q27, Q7, K1, K2, AY)

344-Q. The Transformation of Components of Stress and Strain in Two-Dimensional Elasticity. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 207-211.

Transformation from one system of coordinate axes to another is given by two equations. (Q21)

345-Q. The Distribution of Stress in a Decelerating Elastic Sphere. W. R. Dean, I. M. Sneddon, and H. W. Parsons. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 212-234.

Analysis of distribution of stress in a solid elastic sphere due to the application of a uniform hydrostatic pressure to part of the surface. Numerical example shows variation of stress throughout the sphere. Other comparative cases are treated. Graphs and tables. (Q25, Q21)

346-Q. Distribution of Stress in the Vicinity of a Spherical Inclusion. B. F. Middleton. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test Results. 1952. p. 235-243.

Expressions for the components of stress and displacement at a point near an inclusion embedded in a bar of material subjected to a uniform tensile stress. Results are used to determine a formula for Young's modulus of an alloy, the included particles representing a second phase. (Q21)

347-Q. (Book.) **Strength & Testing of Materials.** v. 6. Part 1. Theoretical Papers on Strength and Deformation. Part II. Testing Methods and Test Results. 504 pages. 1952. Her Majesty's Stationery Office, York House, Kingsway, London, W.C. 2. American distributor, British Information Service, 30 Rockefeller Plaza, New York 20, N. Y.

Consists of 30 papers abstracted separately. (Q general)

348-Q. Fatigue and Creep Testing of Aircraft-Engine Materials. *Engineering,* v. 175, Mar. 20, 1953, p. 353-355.

Equipment and procedure for testing gas-turbine blades. Photographs and diagram. (Q7, Q3)

349-Q. Formation of Deformation Bands in Al-3 Pct Mg Monocrystals During Cold Rolling. J. Herenguel, P. Lacombe, and P. Lelong. *Journal of Metals,* v 5, Apr, 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 559-564.

Investigation of an approximate twin relationship between the bands and surrounding crystal by progressive rolling reductions on monocrystals of varied initial orientation. Diagrams and micrographs. 12 ref. (Q24, Mg)

350-Q. The Influence of Solid Surface Films on the Friction and Surface Damage of Steel at High Sliding Velocities. E. E. Bisson. *Lubrication Engineering,* v. 9, Apr. 1953, p. 75-77, 100-101.

Beneficial and harmful effects of self-repairing and other types of films. Graphs. 11 ref. (Q9, ST)

351-Q. High-Density Alloys for Heavy-Weight Applications. Kenneth Rose. *Materials & Methods,* v. 37, Apr. 1953, p. 86-89.

Properties and uses of tungsten alloys with small amounts of Ni and Cu, fabricated by powder metallurgy methods. (Q general, P10, T general, H general, W, Ni, Cu)

352-Q. Theory of Mechanical Wear. J. T. Burwell. *Research,* v. 6, Apr. 1953, p. 25S-27S.

Reviews previous work. 9 ref. (Q9)

353-Q. Stainless Steel Galling Characteristics Checked. H. Tanczyn. *Steel,* v. 132, Apr. 20, 1953, p. 150-152.

Method using torque wrenches, strain gages, and nut and bolt assemblies. Tabulated data are useful for selecting stainless steels for applications where galling occurs. (Q9, SS)

354-Q. (French.) **Deformation of Al-Cu Monocrystals by Repeated Shocks.** Yves Pironneau. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, Jan. 5, 1953, p. 46-48.

Apparatus for subjecting specimens to rapidly repeated tensile loads. Results show that elongation is proportional to absorbed energy. (Q27, Al, Cu)

355-Q. (French.) **Relationship Between Defects and Failure of a Material.** H. de Leiris. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 14-20.

Possibility of localizing origin of a fracture by morphological analysis. Macrographs. (Q26)

356-Q. (French.) **Methods of Determining Hot Fatigue Limit in Common or Controlled Atmospheres.** Georges Vidal. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 21-33; disc., p. 33-34.

Factors inducing fracture at high temperatures (creep, corrosion, fatigue). Apparatus for determination of hot endurance under alternating overloads in common, neutral, or corrosive atmospheres. Tests were made on pure Al, Co alloys, and chromal. (Q7, Al, Co, Cr)

357-Q. (French.) **Relation of Hardness and Impact Values to Tempering and Quenching Temperatures of Steels.** Frederik Herman Willeumier. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 35-48.

New impact test which makes use of a forked hammer falling on test piece lying on two supports. Tests are made on various carbon and low alloy steels. Tables and graphs. (Q29, Q6, AY)

358-Q. (German.) **Wear Tests With "Lost" Markings.** P. Grodzinski. *Metalloberfläche,* v. 6, Dec. 1952, p. A190-A192.

Tests which indicate wear by decrease in the mark depth. Markings are now made by cutting rather than by impression. Micrographs. (Q9)

359-Q. (Swedish.) **Novel Alloys in Steel Production.** Harry Willners. *Jernkontorets Annaler,* v. 136, no. 11, 1953, p. 445-467.

Production and various properties of low-carbon, high-temperature steels. Effects of heat treatment, stabilizers, and various elements. Graphs and tables. (Q general, AY)

360-Q. (Swedish.) **High-Temperature Yield Point of Unalloyed and Low-Alloy Welding Materials.** Tore Norén and Bengt Ramshage. *Svetsaren,* v. 17, no. 3, 1952, p. 38-39, 42.

Experimental data on nonheat treated, stress-relieved, and normalized steel welded with eight different electrodes are graphed and tabulated. (Q27, K1, AY)

361-Q. Electrical Circuits for Adding Strain Gauge Signals. An Investigation of Modified Wheatstone Bridge Circuits. E. H. Mansfield. *Aircraft Engineering,* v. 25, Apr. 1953, p. 108-114.

Series-parallel, by-passed-gages, parallel series, and galvanometer arm circuits. Diagrams. (Q25)

362-Q. A Cast Iron That Bends and Bounces. *Inco Magazine,* v. 26, no. 1, 1953, p. 16-17, 28-29.

Properties of new engineering material (nodular iron) that bridges the gap between gray iron and cast steel. Photographs. (Q general, CI)

363-Q. The Influence of Thallium on the Creep of Lead. R. C. Gifkins. *Institute of Metals, Journal,* v. 81, Apr. 1953, p. 417-425.

Experiments designed to examine the influence of a particular solute atom on the creep of high-purity Pb. Results given consist of creep data together with microscopical and X-ray observations which illustrate variations in creep characteristics. Graphs and tables. 20 ref. (Q3, Pb, Th)

364-Q. New Tests on Steel Suggest Error in Poisson's Ratio. W. D. Manley. *Iron Age,* v. 171, Apr. 23, 1953, p. 148-150.

Tests using hot rolled 1020 bar stock which were conducted at Oak Ridge. Tables and photographs. (Q21, CN)

365-Q. Effect of Arsenic and Antimony on Temper-Brittleness. G. W. Austin, A. R. Entwisle, and G. C. Smith. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 376-386.

Experiments using low-alloy steels. Study included effect of As and Sb on impact and tensile properties; mechanical implications of temper brittleness; and effect of embrittlement on low-temperature tensile brittleness. Graphs, tables, and micrographs. 25 ref. (Q23, AY)

366-Q. Temper-Brittleness in High-Purity Iron-Base Alloys. A. Preece and R. D. Carter. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 387-398.

Effect of composition on occurrence of temper brittleness was examined by microscopical methods and measurement of transition temperatures. Tables, graphs, and micrographs. 9 ref. (Q23, Fe)

367-Q. Deformation of Austenite in Relation to the Hardness Characteristics of Steel. G. R. Bish and H. O'Neill. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 398-405.

Pyramid hardness of 0.9% C steel during isothermal transformation at two temperatures just above the M_s line was determined. The same steel was plastically deformed by crushing during the incubation period of isothermal transformation at these two temperatures. Hardness and strain-hardening properties of various products of heat treatment were reviewed, and a complete hardness diagram for the Fe-Fe_3C system is given. 22 ref. (Q29, N8, CN)

368-Q. Effect of Boron on the Mechanical Properties of Low-Alloy Steels. R. Wilcock. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 406-419.

Five low-alloy steels were made, each with one ingot treated with B and one ingot without B. Tensile and impact tests in the hardened and tempered condition were carried out on sizes up to 4 in. square. Hardenability was investigated by Jominy end-quench tests and hardness traverses. Tables and graphs. (Q general, J26, AY)

369-Q. Photoelastic Studies of Quenched Cylinders and Spheres. K. A. Parsons. *Journal of Applied Physics,* v. 24, Apr. 1953, p. 469-472.

Mathematical theory of residual stresses of quenching origin based on an idealized model of the quenching process is investigated. Photoelastic curves are computed from the theory and compared with those determined with a Babinet Compensator. Graphs and tables. (Q25, J26)

370-Q. The Role of Preferred Orientation in Elasticity Investigations. G. Bradfield and H. Pursey. *Philosophical Magazine,* v. 44, Apr. 1953, p. 437-443.

Investigates role of preferred orientation in elastic properties of polycrystalline metals and applies these considerations to experimental results. Analysis is confined to metals in the cubic crystalline system with preferred orientation having circular symmetry about the axis of a bar. Expressions are derived for the apparent elastic constants of the bar in terms of the single crystal constants and an anisotropy index. Graphs. (Q21)

371-Q. Anomaly in the Rigidity Modulus of Copper Alloys for Small Concentrations. J. Friedel. *Philosophical Magazine,* v. 44, Apr. 1953, p. 444-448.

Reviews Mott's theory, extends it, and compares with experiments. Diagrams. 13 ref. (Q23, Cu)

372-Q. Neumann Bands in Pure Iron. A. Kelly. *Physical Society, Proceedings,* v. 66, sec. A, Apr. 1953, p. 403-405.

Examination using an X-ray microbeam method. Diagrams. (Q24, Fe)

373-Q. The Stress Distribution in the Head of a Thin-Walled Pressure Vessel. H. B. Fergusson, J. Kudar, and R. B. Harvey. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 6, Mar. 1953, p. 1-14.

Equations of the membrane theory are written in terms of the meridional arc length and are shown to have an approximate solution valid for moderate thicknesses of the shell. Method is applied to a toro-spherical vessel head with a large bunged opening in the center. 7 ref. (Q25)

374-Q. Steels for High Temperature Service. Peter Payson. *Steel Processing,* v. 39, Apr. 1953, p. 168-174.

Creep and rupture tests carried out over a series of stresses and temperatures. Graphs and tables. (Q3, Q4, AY, SS, Ni, SG-h)

375-Q. Experimental Stress Analysis as an Aid to Machine Design. Emmett E. Day. *Trend in Engineering,* v. 5, Apr. 1953, p. 18-21.

Methods, possibilities, and limitations of analysis. (Q25)

376-Q. The Effect of Specimen Geometry on Impact Transition Temperature. R. S. Zeno and J. L. Dolby. *Welding Journal,* v. 32, Apr. 1953, p. 190S-197S.

Statistical study relating specimen size and notch geometry to transition temperatures. Temperatures were determined by absorbed energy, fracture appearance, and contraction of area under notch. Tables and graphs. (Q6, CN)

377-Q. A Note on the Performance of the Increasing-Load Wire Abrasion Tester. F. Levi. *Wire and Wire Products,* v. 28, Apr. 1953, p. 359-361, 419.

Author disagrees with claims presented in previous article. Outlines his views on correct procedures and evaluations of abrasion testing. (Q9)

378-Q. (Italian.) **Properties of Phosphorus and Copper-Alloy Low-Carbon Structural Steels. Part I. Engineering Properties.** Nello Collari. *La Metallurgia Italiana,* v. 45, Jan. 1953, p. 13-21.

Effects of P and Cu contents on tensile and impact properties were examined for normalized specimens. Prevention of phosphorus liquation is discussed. Data are tabulated. (Q27, Q6, AY)

379-Q. (Russian.) **Strength of Welded Pipe-Line Joints.** M. P. Anuchkin. *Avtogennoe Delo,* v. 23, Aug. 1952, p. 13-15.

Tests were made on oil-line pipes which had been in service 10 to 20 years. Causes of service failures. Tables and charts. (Q23, S21, CN)

380-Q. (Russian.) **The Function of Transverse Deformation.** R. A. Mezhlumian. *Prikladnaia Matematika i Mekhanika,* v. 16, June-Aug. 1952, p. 491-494.

Presents a graphical method of determining Poisson's ratio at any stage of deformation. 4 ref. (Q21)

381-Q. The Strength of Metals. A. H. Cottrell. *Chemical Metallurgical & Mining Society of South Africa, Journal,* v. 53, Dec. 1952, p. 177-181; disc., p. 181-182.

Explains in an elementary manner strength, yield stress, creep, brittle fracture, slip, and theory of yield and strain aging of mild steel. (Q23, CN)

382-Q. A New Test Rig for Static Tests on Structures and Components. F. Mueller-Magyari. *Engineers' Digest,* v. 14, Apr. 1953, p. 116-118. Translated and condensed from *Maschinenbau und Wärmewirtschaft,* v. 8, no. 1, Jan. 1953, p. 1-5.

A relatively small-scale universal stressing frame for experimental investigations on flat and dished plates, struts, and lattice structures. Diagrams. (Q27)

383-Q. Strain Gage Circuits From a Bottle. D. K. Wright and J. R. Jeromson, Jr. *Iron Age,* v. 171, Apr. 30, 1953, p. 102-103.

Shows that silver paint originally intended for printed electronic circuits can be used to make slip rings for strain-gage circuits. (Q25)

384-Q. Effect of Temperature on the Endurance Limit and Relaxation of Spring Materials. *Mainspring,* v. 14, Apr. 1953, unpaged.

Graphs show results for music wire, carbon valve, Cr-Si, high Mn, Cr-V, 18-8 stainless, and high speed steels. (Q7, ST)

385-Q. Experiences With Boron Steels in Production. Harry B. Knowlton. *Metal Progress,* v. 63, Apr. 1953, p. 67-74.

Use of B in steels to conserve Ni and Mo. Compares hardenability and mechanical properties of new steels with those they replaced. Use for heat treated parts and as case hardening steels. Photographs, graphs, and tables. (Q general, J26, AY)

386-Q. Maximum Temperature Applications for Type 316 Stainless. *Metal Progress,* v. 63, Apr. 1953, p. 184, 186, 188.

Condensed by R. E. Lochen from "High-Temperature Testing of Type 316 Stainless Steel Sheet", by G. J. Guarnieri, Report No. AECU-1936, U. S. Atomic Energy Commission, Oak Ridge, Tenn. Investigation to determine creep and rupture properties of Type 316 stainless sheet from 1200 to 1800° F. in annealed and as-welded conditions. (Q3, SS)

387-Q. Gencalloy *A* Lead-Alloy Cable Sheath. R. W. Atkinson, L. Meyerhoff, and W. H. Cortelyou. *Power Apparatus and Systems,* Apr. 1953, p. 246-252; disc., p. 252-256.

Data on creep and fatigue characteristics. Graphs and photographs. 16 ref. (Q3, Q7, T1, Pb)

388-Q. Stresses and Deflection in a Flat Plate With Clamped Edges Under Normal Pressure. J. K. Oaks. *Royal Aeronautical Society, Journal,* v. 57, Apr. 1953, p. 244-246.

Testing procedures, strain gages, and results. Graphs. (Q25, A1)

389-Q. (French.) Variation in Range of Microstressing. A. Braun. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 3, Mar. 1953, p. 67-78.

Relationship between hardness value and load for various metals was tested in the 2.5-g. to 50-g. range using pyramidal points. Tests show a clear relationship between structural state of the metal and the dependence of hardness on load. Diagrams and tables. (Q29, Cu, Fe, Pb, Al, Ni, Ag)

390-Q. (German.) Practical Measurements With Strain-Gage Strip Charts. Kurt Fink and Christof Rohrbach. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 95, no. 9, Mar. 19, 1953, p. 265-273.

How strip charts allow more accurate results to be obtained in a variety of applications. Photographs and diagrams. 21 ref. (Q25)

391-Q. (Book.) Designing by Photoelasticity. R. B. Heywood. 414 pages. Chapman & Hall, Ltd., 37 Essex St., London, W.C.2, England. 65s. Od net.

How technique is applied, and the nature of the practically applicable results that can be obtained. The polariscope and its use; photo-elastic materials and models; frozen stress technique for 3-dimensional analysis; stress concentration in notches, screw threads, and at holes; and the application of stress concentration factors. (Q25)

392-Q. (Book.) Mechanics of Materials. Seibert Fairman and Chester S. Cutshall. 420 pages. John Wiley & Sons, Inc., 440 Fifth Ave., New York 16, N. Y. $5.75.

Stress and strain, mechanical properties of materials, bending, deflection, and impact. Presents area-moment method for beam deflection. columns, and combined stresses. (Q general)

393-Q. Stress Waves in Solids. R. M. Davies. *Applied Mechanics Reviews,* v. 6, Jan. 1953, p. 1-3.

Presents review of work done on stress waves. 99 ref. (Q25)

394-Q. Evaluation of Stresses in a Circular Ring by the Relaxation Method. Y. V. G. Acharya, L. S. Srinath, and C. N. Lakshminarayana. *Applied Scientific Research,* sec. A, v. 3, no. 6, 1953, p. 415-428.

Method which is partly experimental and theoretical. Photographs and diagrams. (Q25)

395-Q. Axial Tension and Bending Interaction Curves for Members Loaded Inelastically. D. O. Brush and O. M. Sidebottom. *ASME, Transactions,* v. 75, Jan. 1953, p. 63-71; disc., 71-72.

Presents a theoretical method for constructing dimensionless interaction curves for members subjected to combined tension and bending loads that produce inelastic strains, as well as experimental results which verify the theory. Diagrams and graphs. (Q23, Al, Cn)

396-Q. Influence of Residual Stress on Behavior of Thick-Wall Closed-End Cylinders. J. H. Faupel and A. R. Furbeck. *ASME, Transactions,* v. 75, Apr. 1953, p. 345-354.

Results obtained from macro residual-stress, internal-pressure, and mechanical-property tests on Cr-Ni-Mo-V steel, SAE 3320, and SAE 1045 steel cylinders. Tables and graphs. (Q25, AY, CN)

397-Q. Full-Scale Fatigue Testing of Compressor Cylinders. T. O. Kuivinen. *ASME, Transactions,* v. 75, Apr. 1953, p. 467-471, disc., p. 471-472.

Investigation carried out in fatigue-testing compressor cylinder design. Photographs, graphs, and diagrams. (Q7, CI)

398-Q. The Influence of Aging on the Bauschinger Effect in Inelastically Strained Beams. T. M. Elsesser, O. M. Sidebottom, and H. T. Corten. *ASME, Transactions,* v. 74, Nov. 1952, p. 1291-1296.

Tests were conducted on beams of rectangular cross section made from annealed mild (SAE 1020) and high-carbon (rail) steels. Diagrams and graphs. (Q24, CN)

399-Q. The Effect of Slightly Elevated-Temperature Treatment Upon Microscopic and Submicroscopic Residual Stresses Induced by Small Inelastic Strains in Metals. H. T. Corten and T. M. Elsesser. *ASME, Transactions,* v. 74, Nov. 1952, p. 1297-1302.

Investigation using brass and low-carbon steel. Graphs. 21 ref. (Q25, Cu, CN)

400-Q. Failure of High-Pressure Fuel Pipes. *Engineer,* v. 195, May 1, 1953, p. 628-630.

Investigation to establish the cause of failures occurring in fuel pipelines. Pipes were commonly subjected to resonant vibrations and suffered fatigue fractures. Presents solution. Diagrams and tables. (Q7, SS, CN, Ni-d)

401-Q. Low Load Hardness Tester With a Load Range From 100 to 1000 Grammes. *Industrial Diamond Review,* v. 13, Apr. 1953, p. 84-85.

A hardness tester which fills a gap between existing micro and macro-hardness testers. Can determine hardness of materials down to 0.1 mm. thick. Photograph and table. (Q29)

402-Q. Nickel Restrictions Bring Use of New Stainless Steels. R. A. Lincoln. *Iron Age,* v. 171, May 14, 1953, p. 129-132.

Development of possible Cr-Mn alternates to 18-8 Types 301, 302, and 304. Mechanical and corrosion resistance properties. (Q general, R general, SS)

403-Q. Notes on the Plastic Critical Temperature in Strain-Induced Martensite Reactions. C. Dean Starr. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 654.

True stress-strain curves were obtained for a series of Type 304 stainless steel specimens from 67 to 300° K. Graphs. (Q23, SS)

404-Q. Simple Devices for Approximating Constant Stress During Tensile Creep Tests. R. L. Fullman, R. P. Carreker, Jr., and J. C. Fisher. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 657-659.

Shows that proper choice of dimensions of a simple loading beam permits maintenance of nearly constant stress during creep testing of polycrystalline materials or resolved shear stress during creep testing of single crystals. (Q3)

405-Q. Deformation of Ferrite Single Crystals. F. L. Vogel, Jr. and R. M. Brick. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 700-706.

Reviews previous work and describes experimental procedure. Determination of glide plane, temperature dependence of resistance to shear, yield point, and twinning. Micrographs and graphs. (Q24, Fe)

406-Q. Metallographic Observations of the Deformation of High-Purity Magnesium in Creep at 500° F. A. R.

Chaudhuri, N. J. Grant, and J. T. Norton. *Journal of Metals,* v. 5, May 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 712-716.

Pictorial and qualitative account of the changes that high-purity Mg undergoes during creep at 500° F. 13 ref. (Q3, Mg)

407-Q. On the Propagation of Waves in Isotropic Incompressible Perfectly Elastic Materials. J. L. Ericksen. *Journal of Rational Mechanics and Analysis,* v. 2, Apr. 1953, p. 329-337.

Presents a theoretical analysis. (Q21)

408-Q. Singular Surfaces and Flow Lines in the Theory of Plasticity. T. Y. Thomas. *Journal of Rational Mechanics and Analysis,* v. 2, Apr. 1953, p. 339-381.

Deals with slip surfaces in the plastic region which result from simple tension and compression tests. (Q23)

409-Q. The Effect of Compressibility on the Inclination of Plastic Slip Bands in Flat Bars. T. Y. Thomas. *National Academy of Sciences, Proceedings,* v. 39, Apr. 1953, p. 266-273.

Discusses the classical elasticity theory which relates divergence of the displacement vector and mean stress. (Q24)

410-Q. On the Inclination of Plastic Slip Bands in Flat Bars in Tension Tests. T. Y. Thomas. *National Academy of Sciences, Proceedings,* v. 39, Apr. 1953, p. 257-265.

Applies Hencky stress-strain relations for small plastic displacements to problem of determining inclination of plastic slip bands which develop in an ideal flat bar subjected to tension. (Q27)

411-Q. Viscous Flow. A. V. Brancker. *Petroleum,* v. 16, May 1953, p. 119-124.

Discusses the anomalies encountered in viscous flow, particularly in the extrusion of non-Newtonian materials. Stress-time, strain-time concept is briefly considered. Graphs and diagrams. 25 ref. (Q24)

412-Q. (French.) Measures of Local Deformation and Calculation of Welding Stresses on Both Faces of Bottom Plates of Two Ships in Construction on Ways. R. Spronck and J. J. L. van Maanen. *Revue Soudure,* v. 8, no. 4, 1952, p. 214-232.

Diagrams. Photographs. (Q25, K9, CN)

413-Q. (German.) Hardness Measurement of Silver Surfaces. Albert Keil. *Metalloberfläche,* v. 7, no. 4, Apr. 1953, p. A58-A60.

Discusses unexplained changes of Vicker microhardness values with different loads. Deviations are caused by minute surface variations arising during treatment or alloy separations at an unpolished surface. Graphs. 7 ref. (Q29, Ag)

414-Q. Mechanical Anisotropy in Some Ductile Metals. W. A. Backofen and B. B. Hundy. *Institute of Metals, Journal,* v. 81, May 1953, p. 433-438.

Fracturing test specimens in tension after prestraining in torsion shows that a fibrous crack-like structure, causing a considerable degree of mechanical anisotropy, exists in 70:30 brass, Ni, Monel metal, Armco iron, and high-purity Al. Commercially pure Al samples did not show this effect. Graphs. 14 ref. (Q27, Cu, Ni, Al, Fe)

415-Q. A Note on the Mathematical Analysis of Creep Curves. L. M. T. Hopkin. *Institute of Metals, Journal,* v. 81, May 1953, p. 443-448.

Comparison is made between Andrade and logarithmic equations to determine their relative accuracies in fitting the experimental results from tests of relatively long duration. Effects of grain size and stress on creep behaviour were compared with constants obtained by analyzing the creep curves using the Andrade equation. Graphs, tables. 12 ref. (Q3)

416-Q. Deflection and Stresses in Beams Subjected to Bending and Creep. Yoh-Han Pao and Joseph Marin. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 478-484.

Presents theories which are based on a creep-stress-time relation in simple tension which gives an accurate fit of most test data. Comparison between actual creep deflections for Plexiglas specimens subjected to pure bending and values predicted by the proposed theory shows good agreement between experimental and theoretical results. Application of the theory to the determination of deflections in various kinds of beams. Graphs. (Q3, Q5)

417-Q. Determination of Theoretical Plastic Stress-Strain Relations for Variable Combined Stress Ratios. L. W. Hu and Joseph Marin. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 485-488.

Presents analytical procedure for the determination of theoretical stress-strain relations. Applications show how it can be used. Graphs. (Q23)

418-Q. A Simple Method of Determining Plastic Stresses and Strains in Rotating Disks With Nonuniform Metal Properties. M. H. Lee Wu. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 489-495.

Method of solving plastic deformation of a rotating disk having nonuniform metal properties. Graphs. 9 ref. (Q24)

419-Q. Combined Tension-Torsion Tests for Aluminum Alloy 2S-O. Aris Phillips. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 496-500.

Ten combined tension-torsion tests with thin-walled circular tubes show that the theory of plastic flow represents experimental results with much greater accuracy than does theory of plastic deformation. Graphs, photographs. (Q24, Al)

420-Q. On Longitudinal Plane Waves of Elastic-Plastic Strain in Solids. D. S. Wood. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 521-525.

Theoretical description for the propagation of longitudinal plane waves of large lateral extent in solids, for waves of plastic as well as elastic strain. Importance of hydrostatic compressibility in determining nature of the waves. Results are illustrated by computation of propagation velocities of such waves in 24S-T Al alloy, and by a computation of the propagation of a pressure pulse of short duration through a flat plate. Graphs. 10 ref. (Q23, Al)

421-Q. Torsion of Uniform Rods With Particular Reference to Rods of Triangular Cross Section. Henry Nuttall. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 554-557.

Variational approach to the solution of the Saint-Venant torsion problem. Use is made of the hydrodynamic analogy to extend application of solutions to the problem of flow of a viscous incompressible fluid in a tube of triangular section. (Q1)

422-Q. Stress-Concentration Factors for Single Notch in Flat Bar in Pure and Central Bending. M. M. Leven and M. M. Frocht. *Journal of Applied Mechanics,* v. 19, Dec. 1952; *American Society of Mechanical Engineers, Transactions,* v. 74, p. 560-561.

Investigation of factors. Graphs. (Q5)

423-Q. Some Problems of Orthotropic Plane Stress. H. D. Conway. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 72-76.

Shows how many solutions for problems in isotropic elasticity can be extended to the case where the material is orthotropic. 13 ref. (Q25)

424-Q. The Stress Distributions Induced by Concentrated Loads Acting in Isotropic and Orthotropic Half Planes. H. D. Conway. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 82-86.

Use of the Fourier integral method to solve the problem of the half plane subjected to a concentrated load acting at some finite distance from the straight edge. Results are extended to include the more general problem of the orthotropic half plane. (Q25)

425-Q. Nonlinear Distribution of Bending Stresses Due to Distortion of the Cross Section. H. H. Bleich, *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 95-104.

Theory to explain nonlinear distribution found in recent tests on a passenger ship with long superstructure, and in model tests. Case of constant cross section of the beams is treated. Solutions in qualitative agreement with the tests are obtained for two types of loading. Diagrams. (Q5)

426-Q. The Necking and the Rupture of Rods Subjected to Constant Tensile Loads. N. J. Hoff. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *Society of Mechanical Engineers, Transactions,* v. 75, p. 105-108.

One-dimensional theory of the behavior of a nonlinear visco-elastic bar subjected to a constant tensile load is developed with the aid of a creep law considering secondary creep alone. Theoretical value of the time at which the bar ruptures and the shape calculated for the necked portion of the bar are in satisfactory agreement with the results of experiments. Graphs. (Q27, Q3)

427-Q. Elastic Waves Created During Tensile Fracture. Julius Miklowitz. *Journal of Applied Mechanics,* v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions,* v. 75, p. 122-130.

Phenomenon of the second fracture. Analytical and experimental work carried out on elastic strain waves. Methods of operational mathematics and electric-analog computer were employed in the analytical study. Diagrams. 12 ref. (Q26)

428-Q. Mechanically Mounted Cutting Elements of Cemented Carbide. W. L. Kennicott. *Mechanical Engineering,* v. 75, May 1953, p. 387-392.

Mechanical properties of cutting-tool carbides and effect of properties on design. Mechanically clamped, prismatic-type, and indexable inserts. Diagrams, photographs. (Q general, G17, TS, C-n)

429-Q. Tangential Forces in Wire Ropes. Frederico Hruska H. Madeco. *Wire and Wire Products,* v. 28, May 1953, p. 455-460.

Shows how the driving moments under known conditions and the changes in the distribution of stresses in ropes caused by rotation can be calculated. (Q25)

430-Q. (French.) **Analogical Electrical Model for the Study of the Bending of Beams.** L. Malavard and J. Boscher. *Comptes Rendus hebdomadaries des Séances de l'Académie des Sciences.* vol. 236, no. 11, Mar. 16, 1953, p. 1130-1133.

Practical determination is not difficult, but the above model is very desirable for problems introducing parameters such as load changes; moments of inertia; and the place, nature, and number of supports. Graph. (Q5)

431-Q. (French.) **Group for the Advancement of Methods of Analyzing Stresses.. Measuring Internal Stresses by X-Ray.** A. Guinier. *Métaux Corrosion—Industries,* v. 23, no. 329, Jan. 1953, p. 1-7.

Possibilities and techniques. Diagrams. 6 ref. (Q25)

432-Q. (French.) **Unique Applications of Wire Strain Gauges.** F. Flusin. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 8-11.

Reviews experiences with above under oil and water and at high temperatures at Laboratoire du Centre Technique de l'Aluminium. Graph, diagrams. (Q25, Al)

433-Q. (French.) **Wear Tests on Cutting and Stamping Steels.** Hans Bühler. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 36-42.

Results of examination of 35 different steels. Graphs, diagram, tables. 6 ref. (Q9, TS)

434-Q. (German.) **The Endurance Limit of Welded Al Alloys.** A. Müller-Busse. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 102-105.

Investigates the limits of connections on AlCuMg, AlMg, and AlMgSi alloys. Resistance to bending stress is higher in gas welded connections. (Q7, K2, Al)

435-Q. (German.) **Determination of Elastic Stresses and Plastic Deformations by the X-Ray Back Reflection Process.** Otto Vaupel. *Kolloid Zeitschrift,* v. 129, no. 2-3, Dec. 1952, p. 92-95.

Absolute stress values at a given point can be determined by photoelasticity for transparent bodies and by X-ray back reflection for crystalline substances. Biaxial stresses can be determined by X-ray reflection. Diagrams. (Q25)

436-Q. (German.) **Dependence of Hardness on Test Load.** Wilhelm Späth. *Metalloberfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A38-A40.

Presents a brief theoretical derivation. (Q29)

437-Q. (German.) **Choice of Steels Suitable for Austempering.** Erich Theis. *Stahl und Eisen,* v. 73, no. 6, Mar. 12, 1953, p. 347-360.

Hardness and notched-bar impact tests on 175 plain C steels and others containing Si, Mn, Cr, V, and/or Ti. Graphs. (Q5, Q29, Q26, CN, AY)

438-Q. (Italian.) **Hooke's Law and the Limits of the Field of Elasticity. Static and Fatigue Limit.** A. Kammerer. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 41-46.

Principal mechanical properties of materials can be found by computing general equations of the theory of elasticity. (Q21)

439-Q. (Italian.) **Relaxation and Cold Creep of Steels for Pre-Compressed Structures.** Francesco Merlino. *Metallurgia Italiana,* v. 45, no. 2, Feb. 1953, p. 47-51.

Reviews methods and research results of European laboratories. (Q3)

440-Q. Metals for Extreme Temperatures. Morgan M. Hoover. *Chemical Engineering,* v. 60, June 1953, p. 212-215.

Various factors in selection of metals for high and low temperatures. Graphs. 6 ref. (Q general, CN, AY)

441-Q. Creep Tests on Nimonic Alloys Under Varying Stress and Temperature. D. C. Herbert and D. J. Armstrong. *Engineering,* v. 175, May 8, 1953, p. 605-606.

Results of creep tests on two typical gas-turbine blade materials under cyclic changes of stress and temperature. Graphs. (Q3, Ni)

442-Q. Internal Stress in Castings, M. M. Hallett, chairman, *Institute of*

British Foundrymen, Proceedings, v. 45, 1952, p. A179-A185; disc., p. A185-A189.

Origins of internal stresses. Experimental work carried out on brass double-flange bars, Al grid castings, and gray iron hollow cylinders. Diagrams. (Q25, E general, Cu, Al, CI)

443-Q. Stability of Thin Elastic Plates Covering an Arbitrary Simply Connected Region and Subject to Any Admissible Boundary Conditions. G. A. Zizicas. *Journal of Applied Mechanics*, v. 20, Mar. 1953; *American Society of Mechanical Engineers Transactions*, v. 75, p. 23-29.

Bergman method of solving boundary-value problems by means of particular solutions of the differential equation, which are constructed without reference to the boundary conditions, is applied to problem of stability of thin elastic plates. A direct method is presented for construction of particular solutions that is applicable to both anisotropic and isotropic plates. 39 ref. (Q21)

444-Q. The New Approach to Shell Theory. Circular Cylinders. E. H. Kennard. *Journal of Applied Mechanics*, v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions*, v. 75, p. 33-40.

Presents expressions for the distributions of stress and displacements from which stress resultants are calculated. (Q25)

445-Q. Effect of Surface Condition on Creep of Some Commercial Metals. E. D. Sweetland and E. R. Parker. *Journal of Applied Mechanics*, v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions*, v. 75, p. 30-32.

Relative creep rate of specimens of 2S Al and commercial drawn Cu were investigated with the oxide surface layers removed and, under the same conditions, after the oxide was permitted to form. (Q3, Al, Cu)

446-Q. A Nondestructive Differential-Pressure Test for Thin Shells. J. C. New. *Journal of Applied Mechanics*, v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions*, v. 75, p. 48-52.

Nondestructive, experimental technique for determining incipient buckling pressures of thin shells subjected to external pressure. Applications and limitations of the test. Graphs. (Q23, Al, CN)

447-Q. Movies of Stress Waves in Photoelastic Rubber. H. C. Perkins. *Journal of Applied Mechanics*, v. 20, Mar. 1953; *American Society of Mechanical Engineers, Transactions*, v. 75, p. 140-141.

Successful recording on movie film of stress-wave patterns in gelatin and photo-elastic rubber; advocates use of rubber for photo-elastic studies of impact stress. (Q25)

448-Q. The Effect of Pressure on the Tensile Properties of Several Metals and Other Materials. P. W. Bridgman. *Journal of Applied Physics*, v. 24, May 1953, p. 560-570.

Results of tension tests to fracture materials under superposed hydrostatic pressure. Photographs, graphs. (Q25, Ni, Ta, Cb, Mo, W)

449-Q. Internal Friction and Young's Modulus of Cold-Worked Copper Single Crystals. J. Weertman and J. S. Koehler. *Journal of Applied Physics*, v. 24, May 1953, p. 624-631.

Investigates the behavior of internal friction with respect to cold work. Diagrams, graphs. 13 ref. (Q21, Cu)

450-Q. Effect of Internal Strains on Linear Expansion, X-Ray Lattice Constant, and Density of Crystals. Chester R. Berry. *Journal of Applied Physics*, v. 24, May 1953, p. 658-659.

Gives α the value of 1 instead of 2 in the measurements of density and lattice constant of Ag with Zn impurity. 7 ref. (Q25, P10, Ag, Zn)

451-Q. Zirconium. Its Use in Magnesium Alloys. A. E. Williams. *Mining Magazine*, v. 88, May 1953, p. 273-276.

Grain-refining effect of Zr on Mg. Alloy properties are described. Micrographs. (Q general, M27, Zr, Mg)

452-Q. Testing of Bearing Properties of Metals. D. Tabor. *Nature*, v. 171, May 9, 1953, p. 827.

Methods for testing bearing wear under actual conditions. (Q9)

453-Q. The Effect of Small Amounts of Cold-Work on Young's Modulus of Copper. A. D. N. Smith. *Philosophical Magazine*, v. 44, May 1953, p. 453-466.

Investigation of effect of plastic extension and subsequent low-temperature annealing. Shows there is a reduction of about 11% in the modulus, the greater part of which is recoverable after prolonged annealing at 100° C. Graphs. 11 ref. (Q21, Q24, Cu)

454-Q. Fatigue Testing. Its Machines and Methods. T. R. Breunich. *Product Engineering*, v. 24, Feb. 1953, p. 128-134; Mar. 1953, p. 148-154.

Types and operating principles of some typical single-purpose and universal testing machines. Part 2 includes the resonant machine, semi-special machines, and vibration generators. Diagrams, photographs, and tables. (Q7)

455-Q. Corrugating Roll Life. A. W. Werner. *Tappi,* v. 36, May 1953, p. 171A-175A.

Factors causing wear of chromium-plated corrugating rolls. (Q9, Cr)

456-Q. The Mechanics of Notch Brittle Fracture. A. A. Wells. *Welding Research,* v. 7, Apr. 1953, p. 34r-56r.

A complete report of work carried out to study a new approach to the subject. Tables, photographs, diagrams. 51 ref. (Q23, CN, AY)

457-Q. (French.) **Study of Wear Surfaces With an Electron Microscope.** K. Ogawa and N. Takahashi. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 69-74.

Graphs, micrographs. 4 ref. (Q9, M21)

458-Q. (French.) **Problems of the Strength of Light-Alloy, Heat-Propelled Vanes.** A. Renard. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 79-81.

Problems encountered in jet propulsion of helicopter blades. Tests were made at 150° C. (Q23, T24, Al)

459-Q. (French.) **Influence of Addition Elements on the High-Temperature Behavior of Magnesium Alloys.** Jean Gris. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 87.

Tables. 3 ref. (Q general, B22, Mg)

460-Q. (German.) **Influence of Various Factors on Earing of Al Sheets.** G. Siebel and H. Hug. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 51-58.

Texture of hot rolled sheet from continuous and die cast ingots causes forming of ears. Influences of rolling at 600° C and degree of cold deformation after rolling are discussed. Photographs, graphs. 5 ref. (Q24, F23, Al)

461-Q. (German.) **Determining Tendency Toward Brittle-Fracture of Structural Steels in Notched-Tensile and Notched-Tensile-Impact Tests.** Otto Lisner. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 27-42.

Kuntze test was applied to 130 weldable unalloyed steels. Analytical results of relationship between deformation velocity and brittle-fracture. Graphs, tables. 32 ref. (Q26, Q27)

462-Q. (German.) **Conclusions and Results From Sound Measurement in the Tensile Stress of Metals.** Josef Kaiser. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 43-45.

Hardness and deformation character were studied by means of new electro-acoustic amplifying device. Hardness values, height of internal stresses, and effect of peripheral zone determine a characteristic curve for each substance. Graphs. 8 ref. (Q23, Al, Cu)

463-Q. (German.) **Influence of Alloy Components on Mechanical Properties of Steel.** Hubert Juretzek, Alfred Krisch, and Werner Trommer. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 69-82.

283 melts were made in a 20-kg. high-frequency furnace. The compositions included one to four alloying elements. Graphs, tables. 51 ref. (Q general, AY)

464-Q. (German.) **Correlation Between Chemical Composition and Notched-Bar Impact Strength After Aging of Rimmed Steels.** Helmut Knüppel and Karl Mayer. *Stahl und Eisen,* v. 73, no. 7, Mar. 26, 1953, p. 401-410.

Tests at various temperatures on 16-mm. bars. Check tests were carried out on openhearth and Bessemer steels. Graphs, tables. (Q6, N7, CN)

465-Q. (German.) **Plastic Deformation of Ge at Higher Temperatures.** Ludwig Graf, Hans-Reiner Lacour, and Karl Seiler. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 113-114.

Effect of heating and quenching on electrical resistance was decreased by plastic deformation. Slip bands appearing above 600° C indicated a lattice transformation. Photographs. 3 ref. (Q24, P15, M26, Ge)

466-Q. (German.) **Hardness.** Heribert Moser. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 43-50.

Experiments using the Kapper method were made on various metallic materials. A characteristic material constant for plastic properties was found. (Q29)

467-Q. (Russian.) **Some Suggestions Concerning Rigidity and Noncurvability.** N. V. Efimov. *Uspekhi Matematicheskikh Nauk,* v. 7, no. 5(51), Sept.-Oct. 1952, p. 215-224.

Basic considerations of the theory. Additional conditions formulated and proved. Concludes that a spherical segment does not permit analytical slide curves. (Q23)

468-Q. (Book.) **Advanced Strength of Materials.** J. P. Den Hartog. 379 p. 1952. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $8.50.

Covers torsion, rotating disks, membrane stresses in shells, bending of flat plates, beams on elastic foundation, two-dimensional theory of elasticity, the energy method, buckling, and miscellaneous topics. (Q23)

469-Q. (Book.) **History of Strength of Materials.** Stephen P. Timoshenko. 452 p. 1953. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.

Historical development of the science in chronological order from its beginnings to the present. Major contributions by prominent scientists and engineers. (Q23)

470-Q. Performance of Cast and Rolled Steels in Relation to the Problem of Brittle Fracture. W. S. Pellini, F. A. Brandt, and E. E. Layne. American Foundrymen's Society, Preprint 53-3, 1953, 19 p.

Shows that Charpy V and keyhole notch toughness of cast and rolled steels are similar. Theoretical and engineering aspects are discussed. (Q23, Q26, CI, CN)

471-Q. Mechanical Properties of Cast Titanium-Carbon Alloys. O. W. Simmons and R. E. Edelman. American Foundrymen's Society, Preprint 53-48, 1953, 5 p.

Tensile strength and melting temperatures in relation to C content. Micrographs. (Q23, P12, Ti)

472-Q. Prediction of Mechanical Properties From Chemical Composition for Fully-Annealed Ductile Cast Iron. C. C. Reynolds, C. M. Adams, and H. F. Taylor. American Foundrymen's Society, Preprint 53-51, 1953, 6 p.

Correlation between mechanical properties and composition of ferritic ductile irons. Methods of calculation are described. Graphs, tables. (Q general, CI)

473-Q. Characteristics of High-Strength Magnesium Casting Alloy ZK61. J. W. Meier. American Foundrymen's Society, Preprint 53-54, 1953, 9 p.

Compared with other Mg casting alloys. Graphs. (Q general, Mg)

474-Q. A Review of the Temper Brittleness Phenomenon. K. T. Goodchild. *Birmingham Metallurgical Society, Journal,* v. 33, Mar. 1953, p. 8-28.

Temper brittleness in steels and nonferrous metals. Effects of alloying elements and heat treatment processes on the embrittlement. Theories to explain temper brittleness. 24 ref.
(Q23, J general, ST, EG-a)

475-Q. Typical Brinell Hardness Numbers of Some Nonferrous Alloys. *Foundry,* v. 81, June 1953, p. 175-176.

Tabulated information for Cu-base Al, and Mg alloys. (Q29, Cu, Al, Mg)

476-Q. Cracks and Hot Tears in Steel Castings. John B. Caine. *Foundry,* v. 81, June 1953, p. 120-127, 289-297.

Reviews and re-evaluates results of previous investigations in the light of more recent studies. Correlates various data and shows some order in seemingly conflicting information. Diagrams, graphs. (Q26, CI)

477-Q. Strain Ageing of Mild Steel. Effects of Vanadium or Chromium on the Strain Ageing of Rimming Steels. W. R. D. Jones and G. Coombes. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 9-15.

Effects of small amounts of V and Cr on strain aging, rimming action, and mechanical properties of low-carbon rimming steels. Results for V-treated rimming steels made on a laboratory scale and on a works scale by basic openhearth and basic bessemer processes. Explanation for effects of V, based on thermodynamic data; results are discussed with reference to the dislocation theory. Tables, graphs.
(Q general, P12, Cr, V, CN)

478-Q. The Cleavage Strength of Polycrystals. N. J. Petch. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 25-28.

Mild steel, ingot iron, and spectrographic iron were used in an investigation to determine why coarse-grained steels are more prone to brittle fracture than fine-grained ones. Graphs. (Q26, M27, Fe, CN)

479-Q. Creep Properties of Titanium. D. R. Luster, W. W. Wentz, and D. W. Kaufmann. *Materials & Methods,* v. 37, June 1953, p. 100-103.

Shows that commerically pure Ti has useful creep characteristics in the temperature range up to 750° F. Graphs, photograph. (Q3, Ti)

480-Q. Interim Report on a Fatigue Investigation of a Full-Scale Transport Aircraft Wing Structure. M. James McGuigan, Jr. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note 2920, Apr. 1953, 36 p.

Tests were conducted by the resonant-frequency method at a level of 1 ± 0.625g. or about $22 \pm 14\%$ of the design ultimate load factor. Graphs, tables, diagrams, photographs. (Q7, Al)

481-Q. Creep of Copper Under Stress Pulses. A. J. Kennedy. *Nature,* v. 171, May 23, 1953, p. 927-928.

Behavior of Cu conductors subjected to intermittent stresses. Graphs. (Q3, Q25, Cu)

482-Q. Wear-Resistance Combined With Softness in Bronze Plaster Mold

Castings. Walter Speiser. *Precision Metal Molding,* v. 11, May 1953, p. 39.
Applications to honing tools.
(Q9, T6, Cu)

483-Q. Offers Suggestions for Practical Uses of Research Findings. G. M. Magee. *Railway Track and Structures,* v. 49, May 1953, p. 470-473.
Considers impact from joints, reformed bars, "Rocking Chair" ties, control of tie wear, and Mn crossing frogs. Photographs.
(Q6, Mn, CN, AY)

484-Q. An Evaluation of Plastic Analysis as Applied to Structural Design. Bruce G. Johnston, C. H. Yang and Lynn S. Beedle. *Welding Journal,* v. 32, May 1953, p. 224s-239s.
Design problems and trends in the application of plastic analysis as applied to structural design. Graphs, photographs. 33 ref. (Q23)

485-Q. Plastic Strength and Deflections of Continuous Beams. K. E. Knudsen, C. H. Yang, Bruce G. Johnston, and Lynn S. Beedle. *Welding Journal,* v. 32, May 1953, p. 240s-256s.
Possible savings by using plastic design as distinguished from conventional elastic design. Suggestion for specific design criteria. Diagrams, graphs, 22 ref. (Q23, Q21, CN)

486-Q. (German.) **Testing of Load Signals of Fatigue-Testing Machines.** Max Hempel and Kurt Fink. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 83-91.
Suitability of bonded strain gage as test device. Distinction was made between influences stemming from machine construction, bearing or cylinder welds, and negligence in servicing. Graphs, diagrams. 12 ref.
(Q25, Q7)

487-Q. (German.) **Properties of a Useful Cu-Cr Alloy.** Gerhard Bunge, Eduard R. Honak, and Walter Nielsch. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 71-76.
Mechanical and physical properties at various treatment stages. Possible applications.
(Q general, P general, Cu)

488-Q. (Russian.) **Systems of Differential Equations for First Order Elliptic-Type and Boundary Problems. Applications to the Shell Theory.** I. N. Vekua. *Matmaticheskii Sbornik,* v. 31, no. 2, Sept.-Oct. 1952, p. 217-314.
Theoretical stress analysis. (Q25)

489-Q. Physical Properties of Steel as Functions of the Tempering Temperature. A. A. Peebles. *Engineering,* v. 175, May 15, 1953, p. 613-615.
Shows that principal physical properties may be expressed as mathematical functions of the tempering temperatures. Major physical properties can be deduced from any one of such properties which has been experimentally determined. Graphs. (Q general, J29, AY)

490-Q. The Influence of the Rate of Deformation on the Tensile Properties of Some Plain Carbon Sheet Steels. Joseph Winlock. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 797-803.
What takes place at the yield point, and the influence of the rate of deformation. Graphs, micrographs. 20 ref. (Q23, Q24, CN)

491-Q. Some Mechanical Properties of Forgings in Titanium Alloy 150A. Thomas Reynolds and W. T. Edmunds. *Light Metals,* v. 16, June 1953, p. 187-190.
Results from forgings made by a given technique. Tables, photographs. (Q general, Ti)

492-Q. Rapid Calculation of Microhardness Numbers. L. E. Samuels and T. O. Mulhearn. *Metal Progress,* v. 63, May 1953, p. 82-83.
Two methods for the calculation of indentation microhardness numbers. (Q29)

493-Q. Ultra High-Strength Steels. A. A. Bibee. *Metal Progress,* v. 63, May 1953, p. 95-96, 167.
Summary of information regarding metallurgy, processing, and design considerations of steels heat treated to above 200,000 psi. Report of SAE meeting during Western Metal Congress, Los Angeles, March 1953. (Q23, AY)

494-Q. Bearing Alloy of Iron-Silicon Brass. *Metal Progress,* v. 63, May 1953, p. 202, 204.
Condensed by N. H. Polakowski from "Iron-Silicon Brass as Substitute for Tin Bronzes and Zinc Alloys", by V. V. Gusyev, *Liteynoe Proizvodstvo,* no. 3, 1952, p. 29-30. Development of an Fe-Si brass which is reported to have antifriction properties equivalent to the tin bronzes. Properties and comparisons of relative cost are given.
(Q9, Cu, Fe, Si)

495-Q. How Hard is Hard? Howard E. Boyer. *Modern Machine Shop,* v. 26, June 1953, p. 140-149.
Laboratory concept of hardness testing for the benefit of shop personnel who are responsible for the inspection of parts and materials. Micrographs. (Q29, S general)

496-Q. Developments in the Analysis of Lugs and Shear Pins. M. A. Melcon and F. M. Hoblit. *Product*

Engineering, v. 24, June 1953, p. 160-170.

Method for determining strength of lugs loaded obliquely or transversely. Refined procedure for predicting pin or bolt adequacy in bending failure. Diagrams, graphs. (Q5)

497-Q. Shock or Vibration Isolators? J. Markowitz. *Product Engineering,* v. 24, June 1953, p. 212-214.

Equipment mountings to eliminate service failures from vibration and/or shock. Photographs. (Q9)

498-Q. Charts for Allowable Compressive Stresses in Aluminum and Magnesium Alloys. B. E. Gatewood. *Product Engineering,* v. 24, June 1953, p. 235, 237, 239.

Charts show allowable compressive stresses in both elastic and plastic regions. They are based on a nondimensional compressive stress-strain curve. Graphs. (Q28, Al, Mg)

499-Q. (English.) **Anisotropic Elasticity With Applications to Dislocation Theory.** J. D. Eshelby, W. T. Read, and W. Shockley. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 251-259.

General theory of anisotropic elasticity for a 3-dimensional state of stress in which the stress is independent of one Cartesian coordinate. General theory is applied to the dislocation of metals. (Q21, M26)

500-Q. (English.) **The Effect of Deformation on the Electrical Resistivity of Some Cobalt-Nickel Alloys.** T. Broom and C. S. Barrett. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 305-309.

Resistivity determinations on annealed and deformed wires confirmed that stacking faults can make a large direct or indirect contribution to the increase in resistivity due to cold work. X-ray evidence was obtained for presence of stacking faults in the deformed alloy which had the largest increase in resistivity. Graphs. (Q24, P15, Co, Ni)

501-Q. (German.) **Cinematographic Investigations of Slip-Lines on Aluminium Single Crystals.** R. Becker and P. Haasen. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 325-335.

Cinematographic observations of growth of slip-lines on Al single crystals under constant load. Results in terms of dislocation theory. Graphs, diagrams. (Q24, Al)

502-Q. (English.) **Theory of Initial Stress-Strain Curves in Face-Centered Metals.** J. S. Koehler. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 377.

Briefly reviews work using Al. (Q25, Al)

503-Q. (German.) **Testing of Structure of Finest Cu Wires in Cross-Section Range of 0.15 to 0.02 MM.** F. Erdmann-Jesnitzer and M. May. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 250-254.

Texture was examined with special regard for amount of drawing. Photographs, diagrams. 7 ref. (Q24, Cu)

504-Q. (German.) **Occurrence of a Definite Elastic Limit and of Flow Figures for Brass and Nickel-Silver.** R. Ergang and St. Welz. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 254-256.

β-brass separations in Brass-63 and experimental data concerning definite elastic limit and flow curves. Diagrams. 6 ref. (Q21, Q24, Cu)

505-Q. (German.) **Effects of Working Conditions on Properties of Metallized Coatings of Steel.** Helmut Koch and Joseph Adams. *Schweissen und Schneiden,* v. 5, no. 4, Apr. 1953, p. 131-142.

Shows that composition of metallized wire, temperature, distance of spraying, and fuel-oxygen ratio determine structure and physical properties of metal deposits. Diagrams, photographs, tables, graphs. 12 ref. (Q general, L23, M27, CN)

506-Q. (German.) **New Alloy Structural Steels.** H. Jenny. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 18, no. 12, Dec. 1952, p. 405-412.

Properties and composition. Tables, graphs. (Q general, AY)

507-Q. (German.) **Measuring Creep Resistance of Hard Lead Between 25 and 75° c.** Günter Hillen and Wilhelm Hofmann. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 129-130.

Measurement at 25, 50, and 75° C. Tests were made on alloys containing up to 5.4% Sb. Tables. 6 ref. (Q3, Pb, Sb)

508-Q. (German.) **Observations on Vibration Resistance of Homogeneously Lead-Plated Sheet Steel.** Günter Hillen and Wilhelm Hofmann. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 131-132.

Bending-fatigue tests at room temperature and 100° C. Cracks in Pb plating were determined by measuring electrical resistance. Photographs, charts. 2 ref. (Q7, Pb)

509-Q. (German.) **Investigations of a Hard Lead Tube of the Year 1935.** Wilhelm Hofmann and Rosemarie Engel. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 132-133.

Examines Pb tubes with 1.0% Sb which segregated but did not reduce creep resistance significantly. Photomicrographs. 2 ref. (Q3, Pb, Sb)

510-Q. (German.) **Comparison Between Radiographically and Ferromagnetically Determined Internal Stresses.** Ulrich Dehlinger and Herbert Scholl. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 136-138.

Conditions of agreement and disagreement in results. Graphs. 9 ref. (Q25)

511-Q. Graphical Shear and Moment Calculations. William S. Beller. *Aero Digest,* v. 66, June 1953, p. 21-24.

Mathematical justification of new time-saving method which is accurate yet simple. (Q2)

512-Q. How Well Do Girth Weld Sleeves Resist Loading and Bending Stresses? G. B Grable and G. M. McClure. *Gas,* v. 29, June 1953, p. 87-89.

Investigation to determine actual performance of sleeve reinforcements for girth welds under operating conditions in the field. Photographs. (Q25, K general, CN)

513-Q. Tensile and Impact Properties of High-Purity Iron-Carbon and Iron-Carbon-Manganese Alloys of Low Carbon Content. N. P. Allen, W. P. Rees B. E. Hopkins, and H. R. Tipler. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 108-120.

Tensile and impact properties at various temperatures spanning the tough-to-brittle transition were measured for various heat treatments above and below the Al point. Electron microscope pictures show changes during aging. Graphs, diagrams. 10 ref.
(Q23, Q6, CN, AY)

514-Q. Fully Plastic Rotating Disc With Large Strains. Melvin Zaid. *Journal of Aeronautical Sciences,* v. 20, June 1953, p. 369-377.

Finite strain theory was used to investigate stresses, strains, and speeds leading to failure. Concept of a strain plane is introduced. General solutions are obtained for many specific profiles and materials. It is shown that the bursting speed is dependent largely on profile shape. Graphs. 10 ref. (Q25)

515-Q. Analyzing Beam Vibration. George Sonnemann. *Machine Design,* v. 25, June 1953, p. 123-128.

Simplified method for determining the natural frequency of uniform or nonuniform section beams. Diagrams, tables. (Q9)

516-Q. Stresses in Rotating Parts. R. L. Lake and A. J. Durelli. *Machine Design,* v. 25, July 1953, p. 128-131.

"Creep-freezing" technique and use of brittle coating in conjunction with stepwise load application and plastic models. Diagrams. (Q25)

517-Q. Service Experience With Magnesium in Aircraft. Dale H. Black. *Modern Metals,* v. 9, June 1953, p. 52, 54, 56.

Improvements in Mg ductility which increased applications for aircraft components. (Q23, T24, Mg)

518-Q. The Bauschinger Effect in Some Face-Centered and Body-Centered Cubic Metals. R. L. Woolley. *Philosophical Magazine,* v. 44, June 1953, p. 597-618.

Bauschinger effect was studied in Cu, Al, Pb, Ni, and Fe, after deformations between 1 and 120%. Strain associated with the effect is shown to be approximately proportional to the stress applied to produce work hardening, divided by the elastic modulus. Results agree with those of other workers, but disagree with the predictions of existing theories. Possible qualitative explanation of the effect is suggested. Graphs, tables, diagrams.
(Q24, Cu, Al, Pb, Ni, Fe)

519-Q. A Low Temperature Bath for Constant Temperature Studies. John Vajda and Donald P. Hart. *Review of Scientific Instruments,* v. 24, May 1953, p. 354-355.

Construction and operation of a low-temperature bath used for impact testing. Diagrams. (Q6)

520-Q. Behavior of Single Crystals and of Pure Metals. R. M. Brick. Paper from Behavior of Metals at Low Temperatures, p. 1-38, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Mechanical properties and basic related phenomena. Differences between the metals which remain ductile at low temperatures and those which become brittle. Diagrams, graphs. 30 ref.
(Q general, Fe, Al, Cu)

521-Q. The Influence of Mechanical Variables. John R. Low, Jr. Paper from Behavior of Metals at Low Temperatures, p. 39-70, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Normal influence of a decrease in temperature on the strength and ductility of a metal which does not exhibit a change in the mode of fracture. Shows that influence of mechanical variables is qualitatively the same at low temperatures as at ordinary temperatures if there is no change in the mode of fracture. Graphs. 59 ref.
(Q23, Q26, Al, Fe, Cu, Ni, ST)

522-Q. Influence of Metallurgical Factors. C. H. Lorig. Paper from Behavior of Metals at Low Temperatures, p. 71-105, 1953. American So-

ciety for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Reviews factors which influence low-temperature behavior. Graphs. 38 ref. (Q general, Al, Ni, Cu, Pd)

523-Q. Effect of Hydrogen on the Embrittlement of Zirconium and Zirconium-Tin Alloys. W. L. Mudge, Jr. Paper from Zirconium and Zirconium Alloys, p. 146-167. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Investigation to study the effect of heat treatment on the mechanical properties of Zr and Zr-Sn alloys. Notch impact test method was used. Graphs, tables, micrographs. 14 ref. (Q23, Zr, Sn)

524-Q. (Dutch.) **Copper and Copper Alloys. XI. Phosphorus Bronze Alloys.** W. G. R. DeJager. *Metalen,* v. 8, no. 7, Apr. 15, 1953, p. 163-164.

Chemical composition and hardness. (To be continued.) (Q29, Cu)

525-Q. (German.) **Processes in Deformation and Flow of Matter as a Mechanical-Thermodynamic Problem.** J. Pawlowski. *Kolloid Zeitschrift,* v. 131, no. 1, Apr. 1953, p. 11-18.

Natural system and unified description of important rheological processes resulting from mechanical thermodynamic changes. 11 ref. (Q24, P12)

526-Q. (German.) **Bending Property of Zinc Coatings.** H. Bablik, J. Krystof, F. Götzl, and R. Kukaczka. *Metall,* v. 7, nos. 9-10, May 1953, p. 313-319.

Variables affecting production of ductile Zn coatings, adhesion, deformability, temperature, speed of deformation, and stresses are considered. Photographs, diagrams. 2 ref. (Q5, Zn)

527-Q. (German.) **Effect of Pre- and Post-Treatment on Properties of Welded, Basic Bessemer and Open Hearth Steels.** W. Püngel. *Schweissen und Schneiden,* v. 5, no. 2, Feb. 1953, p. 62-66.

Effects of forging, rolling, age hardening, normalizing, and quenching on impact strength. Micrographs, graphs. (Q6, ST)

528-Q. (German.) **Strength Tests on Flame-Cut Specimens of Cr-V Steel.** A. Erker. *Schweissen und Schneiden,* v. 5, no. 5, May 1953, p. 183-189.

Effect of flame cutting on the hardness, structure, tensile, and fatigue strength of unheat treated and subsequently heat treated specimens. Tables, graphs, diagrams. 6 ref. (Q general, G22, Cr)

529-Q. (German.) **Weld Bend Test According to ONORM M 3052.** H. Melhardt. *Schweisstechnik,* v. 7, no. 3, Mar. 1953, p. 29-34.

ONORM M 3052 standards are compared with the I.I.S. Standards (International Institute of Welding Practice Standards) using bend tests on high strength structural steels. Terms are defined and explained. Photographs, diagrams, tables. 6 ref. (Q5, K9, CN)

530-Q. (German.) **Heat Stability of Heat-Resistant Steels Over a Long Period of Time.** H. Holdt. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 4, Apr. 1953, p. 99-105.

Behavior of various steels shows that predictions of conduct after 100,000 hr. cannot be made after 1000 hr. Brittle fractures and structural changes. Bend stressing. Photographs, graphs, tables. 5 ref. (Q23, SS)

531-Q. (German.) **Effects of Tin and Arsenic on Alloyed Heat Treatable Steels.** Helmuth Krainer. *Stahl und Eisen,* v. 73, no. 2, Jan. 15, 1953, p. 103-104.

V, Cr-V, Cr-Ni-V steels with varying As and Sn contents were tested. Increased Sn caused grain coarsening and lowered impact strengths. Arsenic up to 0.4% had little effect except in the Cr-Ni steel. Tables, graphs. 4 ref.
(Q general, Sn, As, AY)

532-Q. Stress State According to C. Bach. Application of Various Hypotheses. K. Wellinger. *Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 13, May 1, 1953, p. 377-378.

Tabulates hypotheses on uni-axial stressing to permit evaluation of multi-axial stresses. Tables. (Q25)

533-Q. (German.) **Disturbance of Slipping by Aluminum Crystals.** Hansheinz Lange and Kurt Lücke. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 183-191.

The mechanism of solidification of high-purity Al monocrystals was studied. Tables, diagrams, microphotographs. 34 ref. (Q24, N12, Al)

534-Q. (Book.) **Behavior of Metals at Low Temperatures.** 112 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $3.00.

Presents three educational lectures given during the 34th National Metal Congress and Exposition, Philadelphia, Oct. 20-24, 1952. Individual lectures are abstracted separately. (Q general)

535-Q. Textures of Rolled and Annealed Iodide Zirconium. J. H. Keeler, W. R. Hibbard, Jr., and B. F. Decker. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 932-936.

Textures of hot rolled, cold rolled, and cold rolled and annealed Zr sheets were determined by use of an X-ray spectrogoniometer. Experimental procedure and results. Diagrams. 8 ref. (Q24, Zn)

536-Q. An Ethoxylene Resin for Photoelastic Work. H. Spooner and L. D. McConnell. *British Journal of Applied Physics,* v. 4, June 1953, p. 181-184.

More important properties of the material. Opportunities for increased precision in photo-elastic work. Typical examples of its use, major defects of the material (mottle and the development of time-edge stress). (Q25)

537-Q. Compressive Buckling of Stiffened Plates. B. H. Falconer and J. C. Chapman. *Engineer,* v. 195, June 5, 1953, p. 789-791; June 12, 1953, p. 822-825.

Preliminary study of critical and post-buckling behavior of long, simply supported rectangular plates having any degree of longitudinal and transverse stiffening when subjected initially to uniform end thrusts. Graphs. (Q28)

538-Q. Aluminium as a Structural Material. M. Bridgewater. *Engineering,* v. 175, June 12, 1953, p. 762-765; June 19, 1953, p. 793-795.

Properties of Mg-Si-Al alloy H10 regarding specification, stress-strain curve, Young's modulus, corrosion, density, elongation, and fatigue. Design problems including deflections, instability, buckling, torsional failure, and lateral instability. Recent examples of Al structures. Graphs, photographs. 9 ref. (Q general, T26, Al)

539-Q. Why Metals Are Weak. J. C. Fisher. *General Electric Review,* v. 56, July 1953, p. 15-17.

Deformation of crystals. Diagrams. (Q24)

540-Q. The Continuity of Slip Lines Across a Grain Boundary. G. J. Ogilvie. *Institute of Metals, Journal,* v. 81, June 1953, p. 491-495.

Effect of slip planes on crystallographic structure. Graphs, diagrams, tables, photographs. 5 ref. (Q24, Cu, Al)

541-Q. How to Reduce Failures in High Temperature Alloys. W. E. Jones. *Iron Age,* v. 172, July 9. 1953, p. 137-141.

Mechanical properties which influence failures. Micrographs. (Q general, SG-h)

542-Q. Effects of Nuclear Radiations on the Mechanical Properties of Solids. G. J. Dienes. *Journal of Applied Physics,* v. 24, June 1953, p. 666-674.

Nature of radiation effects, detailed effects of nuclear radiation on mechanical properties of solids, and some suggested experiments for further insight. 78 ref. (Q general)

543-Q. Stresses Due to Tangential and Normal Loads on an Elastic Solid With Application to Some Contact Stress Problems. J. O. Smith and Chang Kong Liu. *Journal of Applied Mechanics,* v. 20, June 1953, p. 157-166; *American Society of Mechanical Engineers, Transactions,* v. 75.

Results of two-dimensional approach using real variable method of Hertz's problem of contact of elastic bodies. It is shown that when the combination of loads is applied at the contact area the maximum shearing stress may be at the surface. Effect of range of normal and shearing stresses in the plane of maximum shear and in the plane of maximum octahedral shear on failure by progressive fracture (fatigue). Diagrams. (Q2, Q7)

544-Q. Forced Lateral Vibration of Beams on Damped Flexible End Supports. D. F. Miller. *Journal of Applied Mechanics,* v. 20, June 1953, p. 167-172; *American Society of Mechanical Engineers, Transactions,* v. 75.

Steady-state forced-vibration problem for a beam or rotating shaft on damped, flexible end supports is solved. Diagrams. (Q9)

545-Q. Frequencies of Longitudinal Vibration for a Slender Rod of Variable Section. James L. Lubkin and Yudell L. Luke. *Journal of Applied Mechanics,* v. 20, June 1953, p. 173-177; *American Society of Mechanical Engineers, Transactions,* v. 75.

Natural frequencies of a slender, homogeneous, fixed-free rod of variable section are studied in a one-dimensional theory. First few terms of asymptotic expansions for the roots of the frequency equation are presented. (Q9)

546-Q. On the Plastic Strains in Slabs With Cutouts. P. G. Hodge, Jr. *Journal of Applied Mechanics,* v. 20, June 1953, p. 183-188; *American Society of Mechanical Engineers, Transactions,* v. 75.

Complete elastic-plastic problem is set up for a circular slab with a central circular cutout subjected to uniform external tension. Analysis is carried out under the assumption of generalized plane stress but with possibly finite deformations. Equations are solved by a perturbation method based on the ratio of the maximum shear stress to the shear modulus, in which each of the sig-

nificant quantities, stress, displacement, and slab thickness, is expanded in a power series. (Q21, Q27)

547-Q. Response of an Elastic Cylindrical Shell to a Transverse, Step Shock Wave. R. D. Mindlin and H. H. Bleich. *Journal of Applied Mechanics,* v. 20, June 1953, p. 189-195; *American Society of Mechanical Engineers, Transactions,* v. 75.

An approximate mathematical solution is obtained for the elastic response of a shell encountering a shock wave with wave front parallel to the cylinder's axis. Graphs. (Q21, Q6)

548-Q. The Origin of Damping in High-Strength Ferromagnetic Alloys. A. W. Cochardt, *Journal of Applied Mechanics,* v. 20, June 1953, p. 196-200; *American Society of Mechanical Engineers, Transactions,* v. 75.

Theoretical analysis and test data which explain the damping capacity of standard high-strength alloys in terms of the magnetostrictive effect. Conditions for obtaining maximum damping and results of experiments which provide basis for the development of high-strength high-damping alloys. Graphs. (Q8, SG-n)

549-Q. Effect of Damping Constants and Stress Distribution on the Resonance Response of Members. B. J. Lazan. *Journal of Applied Mechanics,* v. 20, June 1953, p. 201-209; *American Society of Mechanical Engineers, Transactions,* v. 75.

Amplitude of vibration of a member at resonance, as defined by its resonance amplification factor, is analyzed in relationship to the damping properties of materials. Data on damping energy indicate the effect of stress magnitude, stress history, and temperature. Experimental data are presented to confirm the equations derived for resonance amplification factor of members having various shapes and stress distribution. Diagrams. (Q8)

550-Q. Deflections of Circular Beams Resting on Elastic Foundations Obtained by Methods of Harmonic Analysis. Enrico Volterra. *Journal of Applied Mechanics,* v. 20, June 1953, p. 227-232; *American Society of Mechanical Engineers, Transactions,* v. 75.

Solutions in form of Fourier series are given for the problem of circular beams resting on elastic foundations on the assumption that the foundation reacts according to the classical Winkler-Zimmermann hypothesis. Numerical tables of the coefficients of trigonometric series expressing deflections, angles of twist, bending, and twisting moments for both symmetric and antisymmetric loadings. Diagrams. (Q21)

551-Q. Natural Frequencies of Twisted Cantilever Beams. D. D. Rosard. *Journal of Applied Mechanics,* v. 20, June 1953, p. 241-244; *American Society of Mechanical Engineers, Transactions,* v. 75.

Experimental and analytical investigation of the effect of twist for various width-to-thickness ratios. Diagrams, photographs. (Q1)

552-Q. An Analytical Theory of the Creep Deformation of Materials. Yoh-Han Pao and Joseph Marin. *Journal of Applied Mechanics,* v. 20, June 1953, p. 245-252; *American Society of Mechanical Engineers, Transactions,* v. 75.

Theory is proposed for an idealized material. Takes into account initial elastic strain, transient creep strain, and minimum rate creep strain. Diagrams. (Q3)

553-Q. Axisymmetric Flexural Temperature Stresses in Circular Plates. J. E. Goldberg. *Journal of Applied Mechanics,* v. 20, June 1953, p. 257-260; *American Society of Mechanical Engineers, Transactions,* v. 75.

Theoretical analysis. Diagrams. (Q25)

554-Q. Transient Thermal Stresses in Slabs and Circular Pressure Vessels. M. P. Heisler. *Journal of Applied Mechanics,* v. 20, June 1953, p. 261-269; *American Society of Mechanical Engineers, Transactions,* v. 75.

Results of computations for determining transient thermal stresses in slabs and circular pressure vessels. Process of solution is to substitute transient-temperature formulas into the already available stress expressions. A new dimensionless stress parameter is defined and applied to the determination of optimum heating or cooling times of massive pressure vessels. Graphs. (Q25)

555-Q. The Shearing of a Rectangular Block Between Rough Plates. J. W. Craggs. *Journal of Applied Mechanics,* v. 20, June 1953, p. 270-272; *American Society of Mechanical Engineers, Transactions,* v. 75.

Analytical solution. Method used is a particular case of the general method described by G. Pickett. (Q2)

556-Q. The Torsion of Spiral Rods. H. Okubo. *Journal of Applied Mechanics,* v. 20, June 1953, p. 273-278; *American Society of Mechanical Engineers, Transactions,* v. 75.

Mathematical analysis. (Q1)

557-Q. Reinforced Circular Holes in Bending With Shear. S. R. Heller,

Jr. *Journal of Applied Mechanics,* v. 20, June 1953, p. 279-285; *American Society of Mechanical Engineers, Transactions,* v. 75.

Determination of the reinforcement effect of circular holes on the stress distribution in webs of beams subjected to bending with shear. Theoretical solution for a bead-type reinforcement. Diagrams. (Q5, Q2)

558-Q. The Creep of Zinc Single Crystals Under Direct Shear. Elliot H. Weinberg. *Journal of Applied Physics,* v. 24, June 1953, p. 734-744.

Method and results of the creep effect under direct shear and compares the Bauschinger effect. Graphs, tables. 26 ref. (Q3, Q2, Zn)

559-Q. Pure Gliding of Metal Crystals. Hiroshi Kanzaki. *Journal of Applied Physics,* v. 24, June 1953, p. 811.

Evidence that the difference between stress-strain curves obtained in pure gliding and those obtained in the usual tensile test is not as large as described by Rohm. 2 ref. (Q25, Q23, Al)

560-Q. Flange Buckling in a Bent I-Section Beam. J. F. Davidson. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 149-163.

Theoretical analysis. Graphs, diagrams, tables. (Q28)

561-Q. On the Generality of the Cubic Creep Function. A. J. Kennedy. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 172-181.

Application of cubic creep function to a wide variety of materials with results compared with the application to a general power law. Statistical approach to the problem. Graphs, tables. (Q3)

562-Q. The "Elastic Hysteresis" of Uranium. E. R. W. Jones and W. Munro. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 182-188.

Experiments using wrought U. Tables, graphs. (Q21, U)

563-Q. The Combined Bending and Twisting of Thin Cylinders in the Plastic Range. M. P. L. Siebel. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 189-206.

Investigation to test validity of theories under conditions where the plastic and elastic components of the strain increments are comparable and where stresses and the strains are not uniformly distributed. Diagrams, graphs. (Q5, Q1)

564-Q. On the Plastic Distortion of Solid Bars by Combined Bending and Twisting. R. Hill and M. P. L. Siebel. *Journal of the Mechanics and Physics of Solids,* v. 1, Apr. 1953, p. 207-214.

Experimental moment-angle relations for steel bars of circular section plastically strained by combined bending and twisting couples in constant ratio. Tables, graphs. (Q5, Q1, ST)

565-Q. Further Progress in the Development of Mg-Zr Alloys to Give Good Creep and Fatigue Properties Between 500° and 650° F. C. J. Ball, A. C. Jessup, P. A. Fisher, D. J. Whitehead, and J. B. Wilson. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 924-931.

Properties of a new Mg alloy ZT1. ZT1 is shown to be superior to zinc-free Mg-Th-Zr alloys. Graphs, tables. 15 ref. (Q3, Q7, Mg, Zr)

566-Q. Anelastic Behavior of Pure Gold Wire. Donald R. Mash and Lewis D. Hall. *Journal of Metals,* v. 5, July 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 937-942.

Results of experiments on the anelastic behavior of Au, as manifested by grain boundary relaxation. Two grain boundary internal friction peaks are found for 99.9998% Au. It is suggested that grain boundary stability, as determined by orientation, plays a role in the observed effects. Graphs, micrographs. 9 ref. (Q22, M27, Au)

567-Q. The Mechanism of Fretting. I-Ming Feng and B. G. Rightmire. *Lubrication Engineering,* v. 9, June 1953, p. 134-136, 158-161.

A mechanism of fretting based on a new mechanism of wear. Experimental results obtained are cited for supporting this mechanism. Diagrams. (Q9)

568-Q. Shearing Stress in Thin Section Beams. J. Jennings. *Mechanical World and Engineering Record,* v. 133, May 1953, p. 198-201.

Fundamental principles and examples of their application. Diagrams. (Q2)

569-Q. Fatigue Strength and Electroplating. R. H. Warring. *Mechanical World and Engineering Record,* v. 133, May 1953, p. 206-208.

Method to eliminate reduced fatigue strength of Ni and Cr plated steel specimens. Tables, graphs. (Q7, L17, Ni, Cr, ST)

570-Q. Steels for Welding. G. Erber. *Mechanical World and Engineering Record,* v. 133, May 1953, p. 210-212.

Structural and 3-dimensional stress brittleness as factors to consider in selection. (Q23, K general, ST)

571-Q. Embrittlement of Low-Phosphorus Phosphorus "Deoxidised" Coppers. B. T. Houlden and W. A. Baker. *Metallurgia,* v. 47, no. 283, May 1953, p. 223-229.

Embrittlement tests and results. Micrographs, tables. 8 ref. (Q23, Cu)

572-Q. Axial-Load Fatigue Properties of 24S-T and 75S-T Aluminum Alloy as Determined in Several Laboratories. H. J. Grover, W. S. Hyler, Paul Kuhn, Charles B. Landers, and F. M. Howell. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note 2928, May 1953, 63 p.

Tests at Battelle Memorial Institute, Langley Aeronautical Laboratory, and Aluminum Co. of America. Test techniques and results compared with results obtained on unpolished sheet by the National Bureau of Standards. (Q7, Al)

573-Q. Concepts of the Effective Modulus of Elasticity. Abraham Slavin. *New York Academy of Sciences, Transactions,* Ser. II, v. 15, Mar. 1953, p. 145-152.

Chronology and mathematical concepts of the effective (reduced) modulus of elasticity, and the Slavin moduli of elasticity, based on simplified linear mathematical relations. Diagrams. 17 ref. (Q21)

574-Q. Transient Creep in Pure Metals. O. H. Wyatt. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 459-480.

Constant stress testing machine of small inertia and a theory of creep. Diagrams, graphs. 7 ref. (Q3, Cu, Al, Cd)

575-Q. Room Temperature Brittleness of Chromium. H. L. Wain and F. Henderson. *Physical Society, Proceedings,* v. 66, sec. B, June 1953, p. 515-517.

Experiment on causes of room-temperature brittleness. Photograph. 6 ref. (Q23, Cr, SS)

576-Q. On the Theory of Internal Friction in Metals. B. V. Paranjape. *Physical Society, Proceedings,* v. 66, sec. A, June 1953, p. 572-575.

Data show that at high frequencies there is considerable interaction between elastic vibrations of the lattice and the conduction electrons. 4 ref. (Q22)

577-Q. The Plastic Yielding of Notched Bars Due to Bending. A. P. Green. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 6, pt. 2, June 1953, p. 223-239.

Problem of estimating loads sufficient to cause pronounced plastic yielding. Diagrams, graphs, photographs, tables. 5 ref. (Q23, Q5, Cu, SS, ST)

578-Q. A Note on the Finite Extension and Torsion of a Circular Cylinder of Compressible Elastic Isotropic Material. A. E. Green and E. W. Wilkes. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 6, pt. 2, June 1953, p. 240-249.

Considers the above with no special assumptions about the strain-energy function. Two cases discussed. 11 ref. (Q1)

579-Q. The Plate Analogy as a Means of Stress Analysis. J. J. Ryan. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 7-28.

Through the application of Cranz' method under strict control and the comparison of the results obtained with corresponding results by photo-elasticity, the applicability of the plate analogy as a means of stress analysis is determined. Theory of plate analogy. Diagrams, graphs. 10 ref. (Q25)

580-Q. Improved Photogrid Techniques for Determination of Strain Over Short Gage Lengths. James A. Miller. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 29-34.

Methods for photographing on metal a grid of well-defined lines 0.0006 in. wide spaced 0.01 in. apart. Excellent definition of lines was obtained by using cold top enamel and Dyrite black contact emulsion. Applications of the method to the study of strain concentrations in the plastic range and a replica technique for use in measuring strain on curved surfaces. (Q25, Al)

581-Q. Some Phases of the Technique of Recording Performance Data on Large Machines. J. H. Meier. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 35-52.

Several items that were found practical in the course of recording performance characteristics of large machines. Advantage of reference signals in bridge work is stressed. Formulas for relating reference signals to corresponding strains. Method for calculating strain when the various gages in a bridge circuit have different orientation with respect to the stress field. Diagrams, photographs. (Q25)

582-Q. Stress Concentrations Produced by Multiple Semi-Circular Notches in Infinite Plates Under Uniaxial State of Stress. A. J. Durelli, R. L. Lake, and E. Phillips. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 53-64.

Photo-elastic solution of the problem for 1 to 5 notches for the case of uni-axial tension parallel to the plate edge. Graphs, stress patterns. 7 ref. (Q25)

583-Q. Mobile Instrumentation for Automotive Equipment. A. W. Colwell. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 65-76.

Resume of early test work and instrumentation. Present mobile equipment and how it satisfies needs for measuring structural working stresses. Photographs. (Q25)

584-Q. The TMB Strain Cycle Gage and Counter. An Instrument for the Statistical Determination of the Strain History of Structures. N. H. Jasper. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 87-96.

Development of a gage to obtain strain data in a form in which it could be readily used without laborious analysis. Diagrams, photographs. (Q25)

585-Q. Residual Stresses in Surface-Hardened Oil Field Pump Rods. R. E. Hanslip. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 97-111.

Method of determining residual stresses in a solid round rod by removing concentric layers of metal from inside and outside surfaces. Longitudinal residual stresses of flame-hardened, induction-hardened, and gas-carburized rods. Graphs, photographs. 6 ref. (Q25, J2, CN)

586-Q. Determination of Dynamic Stress-Strain Curves From Strain Waves in Long Bars. W. R. Campbell. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 113-124.

Method for experimentally deriving the relation between stresses and strains set up in a long bar by a deformation being propagated as a longitudinal plane wave. Analytical concepts and experimental technique. Results of preliminary tests which demonstrate the application of the method for Cu bars subjected to longitudinal impact. Diagrams, graphs. 11 ref. (Q27, Q25, Cu)

587-Q. Telemetering, Recording, and Analyzing Shock and Vibration Data. C. B. Cunningham. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 125-134.

Special techniques devised to collect and analyze vibration data gathered at locations on ships, aircraft, rockets, and missiles. Graphs. (Q6, Q9)

588-Q. A Mechanical Deflection Gage. An Instrument for Measuring Displacement Under Impact. D. D. MacLaren, I. J. Taylor, and L. S. Beedle. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 135-146.

Construction of the "mechanical deflection gage", its principles and operation. Analysis of records obtained. Photographs. (Q6)

589-Q. Measurement of the Resistance of Materials to Mechanical Shock. T. E. Pardue and B. Goldberg. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 147-156.

Comparison of shock data with results from other mechanical tests shows the common mechanical properties to be inadequate criteria of shock resistance. Ductility of a material and its ability to absorb energy are found to be among the most significant factors. Tables, photographs. (Q6, Al)

590-Q. Impulsive Loads on Beams. William H. Hoppmann, II. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 157-164.

Series of hinged beams were investigated theoretically and experimentally to study strains and deflections of a beam subjected to an intensive force of short duration compared with the period of the fundamental mode. Graphs. (Q5, ST)

591-Q. Properties of Bolts Under Shock Loading. H. M. Forkois, R. W. Conrad, and I. Vigness. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 165-178.

Investigation of the determination of the loads on commonly used types of bolts when subjected to types of shocks that may be expected aboard combat-type naval ships. Determination of good designs and materials for holding-down bolts subject to these shocks. Diagrams, graphs. 7 ref. (Q6, CN)

592-Q. Elastic and Creep Properties of Stresscoat. William F. Stokey. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 179-186.

Methods for measuring elastic constants of "Stresscoat". Summary of results. 8 ref. (Q21, Q3, Q25)

593-Q. The Measurement of Turbine Stresses in Aircraft Engines in the Laboratory, on the Test Bed and in Flight. Denis A. Drew. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 187-202.

Equipment and techniques employed for the study of turbine stresses. Diagrams, photographs. (Q25)

594-Q. Longitudinal Impact of Cylindrical Bars. E. A. Ripperger. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 209-226.

Technique for measuring strains developed by the longitudinal impact of bars. Technique was used to study the effects of various types of restraints on the propagation of a strain wave along a slender cy-

lindrical rod. Experimental results are compared to the results predicted by the elementary theory. Diagrams. 13 ref. (Q6, Q25, ST)

595-Q. Stress Analysis of a Pipe Wrench. G. H. Eisenhardt and W. L. Walsh. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 227-234.

Investigation of strain distribution in a 14-in. pipe wrench. Diagrams, photographs. (Q25)

596-Q. A Method of Waterproofing Electrical Strain Gages. Hans Otto Meyer. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 243-245.

Method for waterproofing an electrical strain gage on a surface which is to be submerged in sea water. Photographs. (Q25, R10)

597-Q. The SR-4 Type Equilateral Fleximeter. G. A. Brewer. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 1-8.

Describes the "Equilateral Fleximeter", developed to permit the determination of midplane stresses from external measurements alone in structures having an inaccessible surface. Diagrams, graphs, tables. (Q25)

598-Q. Determination of Centrifugal Stresses in a Turbosupercharger Impeller by Means of Stresscoat. W. G. Schmittner. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 9-22.

Test apparatus, methods, and results. Photographs. (Q25)

599-Q. Application of Optical Interference to the Study of Residual Surface Stresses. Harold R. Letner. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 23-36.

Advantages of optical interference when used in conjunction with the technque of removing uniform layers of stressed material from surfaces of rectangular specimens of uniform cross-section and measuring resulting deflections. Its adaptability to two-dimensional stress systems. Necessary apparatus and experimental procedures. Diagrams. 18 ref. (Q25, TS)

600-Q. Strength-Stress Life of Helical Gear Teeth. E. J. Wellauer. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 37-52.

Method of approach, scope of tests, and analysis of data. Test procedures and results. Photographs. (Q25, ST)

601-Q. Full Scale Testing of Trailer Structures. P. J. Jung. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 53-64.

Static and mobile equipment used to strain test full-scale prototypes of freight-carrying trailers. Diagrams, photographs. (Q25, Al, CN)

602-Q. Experimental Determination of Foundation Modulus of Elastically Supported Bars and Rings. Edward Wenk, Jr. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 65-78.

Experimental procedure which consists of subjecting prototype structure to steady-state forced vibration during which time the resonant frequencies and modes of vibration are measured. Calculations are then performed using the frequency equations for an elastically supported bar or ring in which the foundation modulus is considered the unknown quantity. Diagrams, tables. 9 ref. (Q21)

603-Q. Further Results on the Tuned Test Mass Method of Vibration Testing. Samuel J. Loring. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 79-92.

Study of the response of the test mass when structural vibrations are excited by either an impulse or a suddenly released load applied at a point on the structure and in a direction which may be different from the direction and point of attachment of the test mass. Tables. 8 ref. (Q9)

604-Q. A Method of Evaluating Loose-Blade Mounting as a Means of Suppressing Turbine and Compressor Blade Vibration. M. P. Hanson, A. J. Meyer, Jr., and S. S. Manson. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 103-116.

Techniques involved in the determination of root damping. Diagrams, graphs. (Q8, Al, N, SS)

605-Q. Application of Xenon Flash-tube to Scattered Light Polariscope. Peter L. Balise. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 117-126.

Use of scattered light in three-dimensional photo-elasticity for the analysis of stress systems to which the standard two-dimensional polariscope is not applicable. Adaptation of a high-speed polariscope to scattered light photo-elasticity. 12 ref. (Q25)

606-Q. Instrumentation and Fundamental Experiments in Plasticity. D. C. Drucker and F. D. Stockton. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 127-142.

Basic experiments on the behavior of thin-walled Al alloy tubes in the plastic range. Techniques of measurement. Diagrams, graphs. (Q23, Al)

607-Q. A Dual-Amplitude Axial-Load Fatigue Machine. A. E. McPherson. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 143-152.

Machines which provide a means of applying a combination of two sinusoidally varying axial loads of different amplitudes with the mean load remaining constant. Each load is applied for a predetermined number of cycles. Diagrams, photographs. (Q7, Al)

608-Q. The Effect of Superposition of Stress Raisers on Members Subjected to Static or Repeated Loads. A. Q. Mowbray, Jr. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 153-166.

Study of the decrease in the strength of members produced by compound notches in the form of grooves superposed upon fillets. Significance of the results of tests in the design of load-resisting members. Diagrams, graphs, tables. 8 ref. (Q25, AY)

609-Q. The Behavior of SR-4 Wire Resistance Strain Gages on Certain Materials in the Presence of Hydrostatic Pressure. W. R. Clough, M. E. Shank, and Melvin Zaid. *Society for Experimental Stress Analysis,* v. 10, no. 2, 1952, p. 167-176.

Use of a pressure calibration method to investigate strains in small grey cast iron and nodular iron pressure vessels. Parameter method of determining the material bulk modulus for such materials with nonlinear stress-strain characteristics was developed in order to check the accuracy of linear corrections for pressure effects on gages used on such materials. Graphs. 6 ref. (Q25, CI)

610-Q. A Mechanism for Controlling Large-Scale Fatigue Testing Machines. W. J. Hall and G. K. Sinnamon. *Society for Experimental Stress Analysis,* v. 10, no. 1, 1952, p. 203-208.

Program to design and fabricate a control mechanism to replace or modify the existing turnbuckle and variable eccentric of a 50,000-lb. machine and be capable of functioning automatically with the machine in operation. Diagrams. (Q7)

611-Q. Development of Weldable High-Tensile Structural Steels. L. Reeve. *Welder,* v. 22, Apr.-June 1953, p. 40-44.

Post-war developments. Indicates various methods by which demands for improved steels have been met. (Q23, K general, ST)

612-Q. Hot Cracking of Steel Welds. E. C. Rollason. *Welder,* v. 22, Apr.-June 1953, p. 45-53.

Factors contributing to cracking of ferrous weld metal. Considers effects of welding technique, S, Mn, Ni, and C. Diagrams, micrographs. (Q26, K general, Mn, Ni, ST)

613-Q. The Problem of Brittle Fracture. C. F. Tipper. *Welder,* v. 22, Apr.-June 1953, p. 54-61.

Brittle fracture, testing for notch-brittleness, and factors effecting fractures in mild steel. Graphs, micrographs. (Q26, Q23, CN)

614-Q. Machine for Testing Steel for Hot Workability and Results Obtained With It. R. Canard. Henry Brutcher Translation 2993, 7 pages. (From *Revue de Metallurgie,* v. 43, 1946, no. 5-6, p. 156-161.)

Development of a hot tensile impact testing machine. Particulars on design and use. Diagrams, graphs, photographs. (Q23, Q6, CN)

615-Q. Influence of Tin and Arsenic on Properties of Heat-Treating Steels. H. Krainer. Henry Brutcher Translation 3026, 3 pages.

Previously abstracted from *Stahl und Eisen.* See item 531-Q, 1953. (Q general, Sn, As, AY)

616-Q. (German.) Screw Dislocations as Stress Centers in Martensite With a (225) Slip System. Otto Krisement. *Archiv für das Eisenhüttenwesen,* v. 24, no. 3-4, Mar.-Apr. 1953, p. 191-198.

It was experimentally shown that the theory proposed by Kurdiumov and Sachs fulfills the requirements for this type of martensite. (Q25, Q24, ST)

617-Q. The Reaction of Metals to Force. P. C. Giles. *Aircraft Engineering,* v. 25, July 1953, p. 204-205.

Examination of fundamentals of resistance to stress with particular reference to the importance of ductility. Diagrams. (Q25, Q23, Al)

618-Q. Effect of Stress Amplitude on Statistical Variability in Fatigue Life of 75S-T6 Aluminum Alloy. G. M. Sinclair and T. J. Dolan. *American Society of Mechanical Engineers, Transactions,* v. 75, July 1953, p. 867-870; disc., p. 870-872.

Groups of 17 to 57 specimens of 75S-T6 Al alloy were tested in rotating bending at six different stress levels. Results of the study are summarized in two equations and in a composite S-N diagram showing lines of equal probability of failure. Tables, graphs. (Q7, Al)

619-Q. Grinding and Lapping Stresses in Manganese Oil-Hardening Tool Steel. H. R. Letner and H. J. Snyder. *American Society of Mechanical Engineers, Transactions,* v. 75, July 1953, p. 873-880; disc., p. 881-882.

Biaxial stress distributions resulting from grinding and lapping annealed Mn oil-hardening toolsteel were determined by sectioning the stressed surface layers and following the changes in curvature of the test specimens by optical interferometry. Two methods of sectioning, lapping, and chemical etching were tested and evaluated. Photographs, graphs. 12 ref.
(Q25, G18, G19, TS)

620-Q. Properties of Automobile Suspension Springs. C. J. Dadswell, J. E. Russell, and R. Fielding. *Engineer*, v. 196, July 10, 1953, p. 56-59.

Manufacture of laminated, coil, and torsion bar springs. Various defects which may arise and precautions taken to prevent them. Tables, graphs. 23 ref.
(Q general, T7, AY)

621-Q. Equipment for Compression-Creep Tests at High Temperatures. A. E. Johnson and N. E. Frost. *Engineering*, v. 176, July 3, 1953, p. 28-29.

Equipment and its operation. Diagrams, graphs. (Q3)

622-Q. Critical-Strain Effects in Cold-Worked Wrought Aluminium and Its Alloys. W. M. Williams and R. Eborall. *Institute of Metals, Journal*, v. 81, July 1953, p. 501-512.

Effects of strain, annealing temperature, and initial grain size on the critical strains and final grain sizes. Graphs, tables. 7 ref.
(Q25, J23, M27, Al)

623-Q. Some Observations on Creep and Fracture From Investigations on Lead Cable-Sheath Alloys. A. Latin. *Institute of Metals, Journal*, v. 81, July 1953, p. 529-539.

Tests, results, and theoretical concepts. Tables, graphs. 34 ref.
(Q26, Q3, Pb, Sb, Te)

624-Q. A Theoretical Investigation of the Deformation Textures of Titanium. D. N. Williams and D. S. Eppelsheimer. *Institute of Metals, Journal*, v. 81, July 1953, p. 553-562.

Calnan and Clews method; shear-stress values; slip and twinning deformation; and tension, compression, and cold rolled textures. Diagrams, tables. 15 ref. (Q24, Ti)

625-Q. The Influence of Composition on the Incidence of Strain Markings in Aluminium Alloys. W. H. L. Hooper. *Institute of Metals, Journal*, v. 81, July 1953, p. 563-568.

Scope of investigation, preparation of materials, and stretching experiments. (Q24, Al)

626-Q. Investigation of the Effect of Fillet Radii on the Torsional Fatigue Strength of Marine Shafting. T. W. Bunyan and H. H. Attia. *Institution of Engineers & Shipbuilders in Scotland, Transactions*, v. 96, pt. 7, 1952-53, p. 425-483; disc., p. 483-492.

Production of test shafts, testing machine, and methods of calibration. Results of large-scale tests are compared with theoretical and small-scale test results obtained by other investigators. Supplementary tests determined the properties and structure of the test shaft material. Includes strain-hardening, penetration of the fatigue cracks, unnotched size effect, and influence of such factors as surface finish and mild understressing in unnotched torsional fatigue. Diagrams, graphs, photographs, tables. 9 ref (Q7, CN)

627-Q. Superheater Tubes. Effect of Phosphorus on the High Temperature Properties of a 0.5% Mo Steel. M. G. Gemmill and J. D. Murray. *Iron & Steel*, v. 26, July 1953, p. 347 350.

Tables, graphs. 5 ref.
(Q general, AY)

628-Q. Bending of Thin Elastic Plates of Variable Thickness. Y. C. Fung. *Journal of the Aeronautical Sciences*, v. 20, July 1953, p. 455-468.

Experiments and theory on subject. Graphs, diagrams. 16 ref.
(Q5)

629-Q. These Curves Show How Section Size Influences Strength Properties of Sand Castings. W. J. Reichenecker. *Materials & Methods*, v. 38, July 1953, p. 80-81.

How proper use of curves will aid in selecting proper alloy and thickness. Diagrams.
(Q23, E11, Al, Cu)

630-Q. Mechanical After-Effects. *Metal Industry*, v. 83, July 10, 1953, p. 30.

After-effects when Cu, Cu alloys, Al alloys, and steels are stressed, applied stress removed, and metals allowed to rest at room temperature. (Q25, Cu, Al, ST)

631-Q. Torsion of Anisotropic Elastic Cylinders by Forces Applied on the Lateral Surface. Harold Luxenberg. *National Bureau of Standards, Journal of Research*, v. 50, May 1953, p. 263-276.

Theoretical analysis. 12 ref. (Q1)

632-Q. Causes of Brittle Fractures in Steel. Earl R. Parker. *Petroleum Engineer*, v. 25, July 15, 1953, p. D39-D40, D42, D44, D46, D49.

Effect of temperature, structural discontinuities, and chemical composition. Photographs, graphs. 11 ref.
(Q26, CN)

633-Q. Residual Compressive Stress Strengthens Brittle Materials. John

O. Almen. *Product Engineering,* v. 24, July 1953, p. 189-191.
Effect of retained residual compressive stress on the ductility of the surface layer of brittle materials in reducing applied surface tensile stress. Spring test data demonstrate beneficial effect of residual compressive stress in the surface of hard steel. Diagrams. (Q23, Q28, G23, ST)

634-Q. The Plastic Instability of Plates. H. G. Hopkins. *Quarterly of Applied Mathematics,* v. 11, July 1953, p. 185-200.
Flow theory of plates under edge stresses. 7 ref. (Q24)

635-Q. On the Development of Plastic Hinges in Rigid-Plastic Beams. M. G. Salvadori and F. Dimaggio. *Quarterly of Applied Mathematics,* v. 11, July 1953, p. 223-230.
Development in beams acted upon by certain types of distributed, dynamic loads. Graphs. (Q24)

636-Q. Welded Ships. An Investigation Into the Causes of Structural Failures. *Sheet Metal Industries,* v 30, July 1953, p. 566-570, 583.
Photographs, diagrams. (Q26, ST)

637-Q. Deformation of Single Crystals. Earl R. Parker and Jack Washburn. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 186-204.
Even slip deformation, the simplest type, is not explained on an atomic scale. Several new techniques are discussed. Acid machined single Zn crystal test method gives excellent reproducibility. (Q24, Zn)

638-Q. High Speed Strain Measurements. G. R. Irwin. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 205-224.
Several recent experiments in the plastic range of several materials. Test instruments. (Q23)

639-Q. The Metallurgical Use of Anelasticity. C. Wert. "Modern Research Techniques in Physical Metallurgy," American Society for Metals, Cleveland, p. 225-250.
Measurement and applications of anelastic data. (Q22)

640-Q. (English.) **'Third-Order' Elastic Coefficients.** R. F. S. Hearmon. *Acta Crystallographica,* v. 6, pt. 4, Apr. 1953, p. 331-340.
Definition of third-order elastic constants and some of the properties of the associated tensors. Direct enumeration of the third-order constants is made for all crystal classes and for the isotropic system. Estimates of the numerical values of certain combinations of third-order constants for Cu, Zn, and Al. Graphs, tables. 18 ref. (Q21, Cu, Zn, Al)

641-Q. (English.) **Some Observations on the Crystallography of Deformation Twins.** E. O. Hall. *Acta Crystallographica,* v. 6, June 1953, p. 570-571.
Twinning of hexagonal, tetragonal, and rhombohedral metals. Table. (Q24, M26)

642-Q. (English, Spanish.) **Combating Failure of High-Pressure Oil Pipes.** *Machinery Lloyd* (Overseas Ed.), v. 25, July 4, 1953, p. 101-104.
Types of failures, vibration frequencies, fatigue limit of pipe materials, and damping of pipes. Diagrams, tables. (Q8)

643-Q. (Dutch.) **Effect of Centrifugal Casting on Bearing Bronze.** Th. G. Köhler. *Metalen,* v. 8, no. 5, Mar. 14, 1953, p. 114-116.
Differences between sand-cast and centrifugally cast bearing bronzes from standpoint of wear resistance. Photographs, graphs, tables. (Q9, E11, E14, Cu)

644-Q. (French.) **Amsler Equipment for Fatigue Tests at High Temperature on High-Frequency Electromagnetic Pulsators (Vibrophores).** A. Tenot. *Metaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 135-140.
Functioning principle of the furnace temperature regulator. Concludes that engineers will now be able to study the behavior of high-temperature materials up to 800° C. Diagrams, photographs. (Q7)

645-Q. (French.) **Apparatus for High-Temperature Compression Testing (Up to 1800° C).** J. Culmann. *Métaux, Corrosion-Industries,* v. 28, no. 331, Mar. 1953, p. 141-142.
Diagram. (Q28)

646-Q. (French.) **Heat Resistant Materials. Creep Tests by Cantilever Bending.** G. T. Harris and H. C. Child. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 152-158.
Advantages, particularly for temperature of 1100° C. and over. Diagrams, photographs. 7 ref. (Q3)

647-Q. (French.) **Considerations on the Elasticity Coefficient and Elasticity Limit of Alumina-Aluminum Complex.** R. de Fleury. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 168-170.
5 references. (Q21, Al)

648-Q. (Russian.) **Fatigue Resistance of Babbitt in Bearings of Transport Diesel Engines.** N. A. Bushe. *Vestnik Mashinostroeniia,* v. 33, no. 2, Feb. 1953, p. 5-10.
Qualities of babbitt. Inexpensive

composition with better heat resistance performance. 3 ref. (Q7, Sn)

649-Q. (Swedish.) **Impact Properties of Soft Steels With Different Aluminum Content.** Ake Josefsson and Erik Nygren. *Jernkontorets Annaler,* v. 137, no. 3, 1953, p. 69-99.

Influence of increased Al content on the tendency to brittle fracture and grain size after various heat treatments. Tables, graphs, photomicrographs. 11 ref. (Q6, J general, CN)

650-Q. An Evaluation of Several Static and Dynamic Methods for Determining Elastic Moduli. John T. Richards. "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 71-98; disc., 98-100.

As a means of evaluating test methods, specimens were submitted to several laboratories and results compared. Static procedures included tension, compression, flexure, and torsion. Dynamic moduli were obtained directly by speed of sound determinations and indirectly by longitudinal, flexural, shear, and torsional vibration. Poisson's ratio was measured directly and also calculated from modulus data. An explanation of the differences on the basis of test methods and conditions is attempted. Tables, graphs. 49 ref. (Q21)

651-Q. Dynamic Methods for Determining the Elastic Constants and Their Temperature Variation in Metals. M. E. Fine. "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 43-67; disc., p. 68-70.

Introduction to the theory is given. Various methods using vibrations ranging in frequency from a fraction of a cycle to 30 megacycles per sec. are critically reviewed. Dynamic methods are capable of giving precise results and are more convenient than static measurements if the sample is small, brittle, has large creep effects, or if knowledge of the elastic constants as functions of temperature is desired. Diagrams, tables, graphs. 64 ref. (Q21)

652-Q. Report on ASTM Task Group for Determination of Elastic Constants. Walter Ramberg. "Symposium on Determination of Elastic Constants". American Society for Testing Materials, Philadelphia, p. 3-9.

Survey made to determine values of elastic constants and methods to obtain values. Graphs, tables. (Q21)

653-Q. The Influence of Temperature on the Elastic Constants of Some Commercial Steels. F. Garofalo, P. R. Malenock, and G. V. Smith. Paper from "Symposium on Determination of Elastic Constants", American Society for Testing Materials, Philadelphia, p. 10-27; disc., p. 28-30.

Elastic moduli in tension and shear were determined at various temperatures between 75 and 1500° F. for 21 commercial steels. Diagrams, tables, graphs. 20 ref. (Q23, CN, AY)

654-Q. (Book.) **High-Temperature Alloys.** C. L. Clark. 383 p. 1953. Pitman Publishing Corp., 2 W. 45th St., New York 19, N. Y. $7.50.

Summarizes present standards of knowledge of the behavior of alloys at elevated temperatures. Engineering aspects of alloy steel are emphasized. Procedures for selecting permissible working stresses, and activities of the various specifications and code writing bodies. (Q general, SG-h)

655-Q. (Book.) **Introduction to the Theory of Plasticity for Engineers.** Oscar Hoffman and George Sachs. 276 p. 1953. McGraw-Hill, New York 36, N. Y. $6.50.

Basic laws and theories necessary for understanding theory of plasticity. Concepts of stress and strain tensors. Behavior of the thick-walled spherical shell and the thick-walled tube under internal pressure, and rotating cylinders and disks. all of ideally plastic materials. (Q23)

656-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings, (Annual Volume) v. 10, nos. 1 and 2, 1952.** 421 p. Society for Experimental Stress Analysis, Central Square Station, P.O. Box 168, Cambridge 39, Mass.

Consists of individual papers, separately abstracted, on various aspects of stress analysis. (Q25)

657-Q. (Book.) **Symposium on Determination of Elastic Constants.** 100 p. 1952. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Individual papers pertaining to methods for commercial steels, metals, and nonmetallic materials are abstracted separately. (Q21)

658-Q. The Stresses in the Reels of Cold Reduction Mills. R. B. Sims and J. A. Place. *British Journal of Applied Physics,* v. 4, July 1953, p. 213-216.

Investigation of stresses, adaptation of Inglis's theory. Photographs, graphs. (Q25)

659-Q. Avoid Crankshaft Failures. *Diesel Power and Diesel Transportation,* v. 31, July 1953, p. 80-82.

Failures due to bending and torsion. Inspection procedures. Photographs. (Q5, Q1, S general, CN)

660-Q. Possibility of Error in Poisson's Ratio for Steel. W. D. Manley. *Engineers' Digest,* v. 14, July 1953, p. 256.

Condensed from the original in *Iron Age*. See item 364-Q, 1953. (Q21, CN)

661-Q. Design of Low Frequency Fatigue Testing Machines. C. V. Joga Rao and L. S. Sreenath. *Indian Institute of Science, Journal,* v. 35, Apr. 1953, p. 87-92.

Two types of equipment. Diagrams, photographs. (Q7)

662-Q. Investigation of Stresses Around a Hole in Thin Rotating Disks of Hyperbolic and Parabolic Profiles. S. Kumar and C. V. Joga Rao. *Indian Institute of Science, Journal,* v. 35, Apr. 1953, p. 93-102.

Theoretical analysis. Diagrams. (Q25)

663-Q. The Properties of Cast Chromium Alloys at Elevated Temperatures. I. The Melting and Casting of Chromium-Rich Alloys. A. H. Sully, E. A. Brandes, and A. G. Provan. **II. Some Properties of Certain Binary Chromium-Rich Alloys.** A. H. Sully and E. A. Brandes. **III. The Creep Properties of Ternary and More Complex Chromium-Base Alloys.** A. H. Sully and E. A. Brandes. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 569-584.

Tables, diagrams, graphs. 18 ref. (Q general, E general, Cr)

664-Q. The Effect of Temperature and Purity on the Ductility and Other Properties of Chromium. A. H. Sully, E. A. Brandes, and K. W. Mitchell. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 585-598.

Preparing pure Cr, mechanical testing, fracture and deformation characteristics. Graphs, tables. 26 ref. (Q general, Cr)

665-Q. The Stepped Stress-Strain Curve of Some Aluminium Alloys. N. Krupnik and Hugh Ford. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 601-615.

Tensile tests were made with four Al alloys pulled at constant rates of either loading or straining to establish basic yield-stress curves. Tables, diagrams, graphs. 11 ref. (Q27, Al)

666-Q. Discontinuous Flow and Strain-Ageing in a 6% Tin Phosphor-Bronze. N. H. Polakowski. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 617-624.

Tension tests were carried out on 0.2-in. diam. alpha-bronze rods after various initial treatments. Effects of grain size, strain rate, rate of cooling from the annealing temperature, kind and amount of prestrain, state of residual stress in the metal, aging treatment, and testing temperature on deformation properties. Diagrams. 20 ref. (Q27, Cu)

667-Q. Yield-Point Phenomena and Stretcher-Strain Markings in Aluminium-Magnesium Alloys. V. A. Phillips, A. J. Swain, and R. Eborall. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 625-647.

Formation of stretcher-strain markings in Al-Mg alloys was correlated with the stress-strain diagram. Tables, diagrams, graphs. 48 ref. (Q27, Al, Mg)

668-Q. Effect of Composition and Heat-Treatment on Yield-Point Phenomena in Aluminium Alloys. V. A. Phillips. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 649-661.

Discontinuous yielding was studied in commercial Al and some common alloys not containing large amounts of Mg. Tables, graphs. 11 ref. (Q27, J general, Al)

669-Q. Measurements of Stacking Faults in Cold-Worked Alpha Brass. B. E. Warren and E. P. Warekois. *Journal of Applied Physics,* v. 24, July 1953, p. 951-952.

Peak separation resulting from stacking faults. Graph. (Q24, Cu)

670-Q. Deduction of the Maximum Torsional Stress in a Shaft With Notches. Sennosuke Momma. *Journal of Applied Physics,* v. 24, July 1953, p. 959-960.

Solution for a twisted shaft with circumferential notches periodically situated along its length. Graphs. (Q1)

671-Q. Isothermal Temper Embrittlement of SAE 3140 Steel. F. L. Carr, M. Goldman, L. D. Jaffe, and D. C. Buffum. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 998.

Data on embrittlement around 525° C. Table, diagram. 5 ref. (Q23, AY)

672-Q. Plastic Bending of Zinc Crystals. G. P. Conard II, B. L. Averbach, and Morris Cohen. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1036-1038.

Effect of bending on the crystal formation. 5 ref. (Q5, Zn)

673-Q. Mechanical Properties of Steel. *Machine and Tool Blue Book,* v. 49, Aug. 1953, p. 209, 211, 213.

Tabulated data. (Q general, ST)

674-Q. Data for Structural Design in H10 Alloy. M. Bridgewater. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 304-308.

Properties and applications. Graphs, tables. (Q general, Al)

675-Q. Recent Researches on Aluminium and Its Alloys. Influence of Grain Size and Purity on Mechanical Properties. D. C. G. Lees. *Metal Treatment and Drop Forging,* v. 20, July 1953, p. 293-299, 306.

Investigations on factors influencing cast structure and their effect on mechanical properties. Recent advances in stud welding, stud hardening, and flame and arc cutting. 18 ref. (Q general, K1, G22, Al)

676-Q. Variation of the Incompressibility of an Elastic Material Subjected to Large Hydrostatic Pressure. A. Keane. *Nature,* v. 172, July 18, 1953, p. 117-118.

Two formulas for calculation of incompressibility, based on Birch's and Murnaghan's theory. Table. 3 ref. (Q28)

677-Q. Brittle Coatings for Use in Stress Analysis Under Varying Temperature Conditions. Fred N. Singdale. *Nondestructive Testing,* v. 11, July 1953, p. 37-39.

Advantages of stress-indicating enamels. Photographs. (Q25)

678-Q. A Single Crystal Extensometer. A. J. Kennedy. *Review of Scientific Instruments,* v. 24, July 1953, p. 505-507.

Mechanism which, when loaded with a constant weight, maintains constant stress on the slip planes of a single crystal extending under creep. Diagrams. 14 ref. (Q3)

679-Q. Deformations and Stresses in Symmetrically Loaded Circular Plates of Varying Thickness. D. C. Boston. *Royal Aeronautical Society, Journal,* v. 57, July 1953, p. 449-454.

Theoretical analysis. Graphs, diagrams. (Q25)

680-Q. Substructure of Metals Determines Elastic Behavior. Norman P. Goss. *Steel,* v. 133, Aug. 3, 1953, p. 130.

(Q21)

681-Q. New Aluminum-Tin Bearing Alloys. *Tin and Its Uses,* June 1953, p. 2-4.

Production method permitting higher Sn contents combined with high fatigue strength in bearing alloys. Table, photographs. (Q7, C general, Al, Cu, Sn)

682-Q. Statistical Aanlysis of Behavior in the Transition Temperature Zone. R. W. Vanderbeck, H. D. Wilde, R. W. Lindsay, and C. Daniel. *Welding Journal,* v. 32, July 1953, p. 325S-332S.

Investigations determining notch toughness of steel at various temperatures. Graphs, tables. 7 ref. (Q23, ST)

683-Q. Mechanics of the Explosion Bulge Test. Carl E. Hartbower. *Welding Journal,* v. 32, July 1953, p. 333S-341S.

Semiworks-scale test of weldments featuring simple geometry and biaxial loading. Diagrams, graphs, photographs. 5 ref. (Q6, K9, CN)

684-Q. Further Developments in the Measurement of the Coefficient of Static Friction. H. Dean Baker, W. Claypoole, and D. D. Fuller. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 23-29.

Frictional phenomena in a system where the thickness of the oil film is of the order of molecular dimensions. Sensitive friction tester was rearranged to provide for automatic photographic recording of results. Graphs. 13 ref. (Q9)

685-Q. Statistical Mechanics of Complex Vibrating Systems. Sanford P. Thompson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 49-56.

Preliminary report on an attempt to use the methods of statistical mechanics for making useful engineering predictions about the vibrations of complex mechanical systems whose structure is considered known but whose excitations are governed only by probability distributions. (Q9, S12)

686-Q. Transverse Vibration of One- and of Two-Span Beams Under the Action of a Moving Mass Load. Robert S. Ayre, Lydik S. Jacobsen, and Chieh Su Hsu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 81-90.

Effect of varying the ratio of the weight of the load to the weight of one span of the beam. A quantitative comparison of the known cases of the single-span beam was related to the 2-span beam. Diagrams, graphs. 16 ref. (Q9)

687-Q. Structural Damping in a Simple Built-Up Beam. T. H. H. Pian and F. C. Hallowell, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 97-102.

Basic theory for the bending of a simple built-up beam with thin splicing or reinforcing spar caps. Relationships between load and deflection and between amplitude of load and friction loss in the course of cyclic loadings. Diagrams. (Q8)

688-Q. Critical Speeds of Uniform Shafts Under Axial Torque. Michael Golomb and R. M. Rosenberg. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 103-110.

Effect of axial torques on the critical speeds of uniform shafts with round cross section. Problem is solved in detail for shafts in self-aligning and in rigid-end bearings. (Q1)

689-Q. Coefficients of Irregularity of a Rotating System Considering Torsional Elasticity of the Shaft. Arthur P. Boresi. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 111-117.

Method for calculating coefficients of irregularity in a complex torsional system. System consists of an impeller, a generator and a diesel-engine set in which the driving and driven shafts are connected by a flexible coupling. Tables and curves. (Q1)

690-Q. Some Observations on Elastic Stability. J. N. Goodier. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 193-202.

Buckling according to nonlinear characteristics; lateral buckling of bars. Diagrams. 12 ref. (Q21, Q28)

691-Q. Non-Linear Vibration Problems Treated by the Averaging Method of W. Ritz. K. Klotter. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 125-131.

Method for obtaining quantitative information concerning steady-state vibrations governed by nonlinear differential equations. 9 ref. (Q9)

692-Q. Transverse Impact of Long Beams, Including Rotary Inertia and Shear Effects. M. A. Dengler and M. Goland. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 179-186.

Analysis of the effects of impact on a long beam by a concentrated load. 13 ref. (Q6)

693-Q. A One-Dimensional Theory of Compressional Waves in an Elastic Rod. R. D. Mindlin and G. Herrmann. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 187-191.

Energy considerations, stress and displacement equations of motion, waves in an infinite bar, and equation of axial motion. Graphs. (Q28)

694-Q. Effects of an Oscillating Tangential Force on the Contact Surfaces of Elastic Spheres. R. D. Mindlin, W. P. Mason, T. F. Osmer, and H. Deresiewicz. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 203-208.

Diminishing and oscillating tangential force and experimental tests. (Q21)

695-Q. On the Axisymmetric Problem of Elasticity Theory for a Region Bounded by Two Concentric Spheres. E. Sternberg, R. A. Eubanks, and M. A. Sadowsky. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 209-215.

Exact series solution in explicit form for the stresses and displacements in a spherical shell under arbitrary axisymmetric surface tractions. Solution is based upon the Boussinesq stress-function approach referred to spherical co-ordinates. 18 ref. (Q21)

696-Q. A Method for the Solution of the Restrained Cylinder Under Compression. E. D'Appolonia and N. M. Newmark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 217-226.

Numerical method which can be applied to stress solutions of most radially symmetric problems. Diagrams. 7 ref. (Q28)

697-Q. The Stresses Around a Small Opening in a Beam Subjected to Bending With Shear. S. R. Heller, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 239-245.

Exact solution for the stress distribution around a small opening in the web of a beam subjected to bending with shear. Maximum stress concentration factors are compared with those for similar openings subjected to tension, shear, and pure bending, as well as for similar cases of simpler geometry. Diagrams, graphs. 8 ref. (Q2, Q5, Q25)

698-Q. Thermal Stresses in Perforated Plates. G. Horvay. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 247-257.

Method for the analysis of perforated plates of triangular layout when the loading is applied in the plane of the plate. Method is applied to the determination of the stresses and distortions that result in a tube sheet, supported by six radial spokes from an outer shell, when the temperature of the sheet is lowered below the temperature of the shell. Diagrams, graphs. (Q25)

699-Q. On the Estimation of Torsional Rigidity and Other Physical Quantities. J. B. Diaz. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 259-263.

Special case of the estimation of torsional rigidity using previous results on quadratic integrals. (Q1)

700-Q. The Effect of Initial Twist on the Torsional Rigidity of Thin Prismatical Bars and Tubular Members. Chen Chu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 265-269.

Simple approximate method to evaluate the increase of torsional rigidity due to the presence of initial twist. (Q1)

701-Q. A Theory of Twisted Bourdon Tubes. Chen Chu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 271-280.

General theory of the twisted Bourdon tube to predict its elastic behavior as a pressure-responsive element. Diagrams, graphs. (Q21, Q1)

702-Q. On the Application of Trigonometric Series to the Twisting of I-Type Beams. John E. Goldberg. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 281-283.

Twisting of I-type beams which are free to warp at the ends and are subjected to one or more torsional loads applied at intermediate locations. (Q1)

703-Q. Studies in Three-Dimensional Photoelasticity. Max M. Frocht and Roscoe Guernsey, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 301-307.

Method which, in conjunction with the "freezing and slicing" technique, makes it possible to determine six independent stress components at any point in a general 3-dimensional body. Diagrams. 12 ref. (Q25)

704-Q. Stress Distribution in Plates Under a Uniaxial State of Stress, With Multiple Semicircular and Flat-Bottom Notches. A. J. Durelli, R. L. Lake and E. Phillips. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 309-315.

Method of determining the stress on free boundaries by means of the brittle coating technique, together with the determination of principal stresses across the plate width by using a combination of photo-elastic and brittle coating data. Diagrams, graphs. (Q25)

705-Q. Photoelastic Determination of Stresses on the Surface of Poppet Valves. M. M. Lenven and M. M. Frocht. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 317-324.

Investigation of stresses for three basic types of head design using relatively large Fosterite models and the method of "stress-freezing and slicing". Diagrams, graphs, stress patterns. (Q25)

706-Q. Surface Stress Singularities Resulting From Various Boundary Conditions in Angular Corners of Plates Under Bending. M. L. Williams. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 325-329.

Investigation and results. Simple semi-empirical formula for the stresses along the edges of a plate of polygonal planform. (Q5, Q25)

707-Q. Circular and Rectangular Plates Under Lateral Load and Supported by an Elastic Solid Foundation. Gerald Pickett and Frank J. McCormick. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 331-338.

Bending of thin plates of finite size, supported in a horizontal plane by an elastic solid foundation. Graphs. (Q5)

708-Q. Large Deflections of Rectangular Plates. M. Stippes. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 339-345.

Investigation in which the membrane stresses are not neglected. Procedure for obtaining the solutions of equations for a class of boundary conditions. (Q25, Q5)

709-Q. The Effective Width of a Circular Cylindrical Shell Adjacent to

a Circumferential Reinforcing Rib. Bruno Thürlimann, Rudolf O. Bereuter, and Bruce G. Johnston. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 347-356.

Analytical and experimental study of thin cylindrical shells reinforced with ribs in the circumferential direction. Diagrams, graphs. 12 ref. (Q25)

710-Q. Determination of the Effective Width of Plates With Small Deviations From Flatness by the Method of Split Rigidities. P. P. Bijlaard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 357-362.

Results of investigation. 8 ref. (Q25)

711-Q. A Numerical Method for the Solution of Plate Buckling Problems. W. J. Austin and N. M. Newmark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 363-371.

Numerical method for the solution of problems concerned with buckling of flat rectangular plates under conditions for which the usual partial differential equation of equilibrium can be reduced to an ordinary differential equation. (Q28)

712-Q. On the Optimum Distribution of Material in Sandwich Plates Loaded in Their Plane. P. P. Bijlaard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 373-380.

Investigation to find properties of future materials that would be most desirable for use in the core of sandwich plates that are loaded by forces in their own plane. Only isotropic material and elastic buckling were considered. Diagrams. (Q23)

713-Q. Bending and Buckling of Rectangular Sandwich Plates. A. Cemal Eringen. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 381-390.

Four partial differential equations for the bending and buckling of rectangular, flat sandwich plates having homogeneous cores subjected to various types of loading and boundary conditions using the theorem of minimum total potential. Graphs. 16 ref. (Q28, Q5)

714-Q. Torsional Instability of a Long Sandwich Cylinder. George Gerard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 391-394.

Analysis of a sandwich element in which the core material was considered to be isotropic and the bending rigidity of the faces about their own middle surface was assumed to be negligible. 7 ref. (Q5, Q1)

715-Q. Elastic Instability of Deep Cantilever Struts Under Combined Axial and Shear Loads at the Free End. Harold C. Martin. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 395-402.

Investigation of failure by elastic instability, due to the combined action of the applied loads. Experimental determinations of various critical-load combinations for the uniform strut. Diagrams. 9 ref. (Q21)

716-Q. Lateral Buckling of Beams of Rectangular Cross-Section Under Bending and Shear. M. G. Salvadori. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 403-405.

Results of investigation. (Q2, Q5)

717-Q. Lateral Buckling of Eccentrically Loaded I- and H-Section Columns. H. N. Hill and J. W. Clark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 407-413.

Experimental investigation of failure by lateral buckling involving twisting of the member and bending in the direction perpendicular to the plane of the applied bending moment. Graphs, tables. (Q28, Q1, Q5)

718-Q. The Effect of Residual Stresses on Column Strength. William R. Osgood. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 415-418.

General expression for the buckling load of a column containing residual stresses assumed to be the same at every cross section and so distributed over the cross section that the Engesser-Shanley theory may be applied. (Q28, Q25)

719-Q. The Maximum Load Supported by an Elastic Column in a Rapid Compression Test. N. J. Hoff, S. V. Nardo, and Burton Erickson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers p. 419-423.

Values of the maximum load are calculated and presented in a diagram for a wide range of the dynamic similarity number and of the initial deviation of the column from perfect straightness. Graphs. (Q28)

720-Q. The Behavior of a Simply Supported Column Under Constant or Varying End Load With Transverse Displacement of One Point of Support. V. L. Salerno, Frances Bauer, and James Sheng. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 425-434.

Response of a simply supported column is calculated when one end of the column undergoes a prescribed lateral displacement in the form of a pulse. Time-displacement curves of the motion are obtained. 9 ref. (Q28)

721-Q. Numerical Analysis of the Process of Buckling of Elastic and Inelastic Columns. J. P. Chawla. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 435-441.

Numerical method of step-by-step integration of the dynamic equations for the transverse motion of an initially slightly curved column. Results are presented in a nondimensional form. Graphs. (Q28)

722-Q. The Effect of Prestressing on the Buckling Loads of Statically Redundant, Rigid-Jointed Trusses. E. F. Masur. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 443-448.

Shows that, for a rigid-jointed truss which is statically indeterminate with respect to its axial force distribution, the critical loads corresponding to neutral equilibrium generally can be increased through the introduction of suitable initial stresses. Equations governing the extreme values of the buckling loads are derived and applied to the case of a simply redundant truss. 8 ref. (Q28)

723-Q. Shortening of Column With Initial Curvature and Eccentricity and Its Influence on the Stress Distribution in Indeterminate Structures. Tung H. Lin. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 449-452.

Method of calculating the shortening of a pin-ended compressive member with initial curvature and eccentricities at different loads. (Q28)

724-Q. Creep in Metallic and Non-Metallic Materials. E. Orowan. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 453-472.

Survey of creep phenomena. Viscous, elastic and plastic creep and the calculation of stress and strain fields in bodies under creep conditions. Diagrams. 44 ref. (Q3, Pb)

725-Q. A Review of the Definitions of Finite Strain. A. V. Hershey. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 473-478.

Compares various published representations of strain with the conventional strain. Analysis is illustrated by an application to the practical case of a surface grid which is simultaneously stretched and sheared at variable rates. 38 ref. (Q25, Q27)

726-Q. The Principle of Minimum Work Applied to States of Finite, Homogeneous, Plane, Plastic Strain. A. Nadai. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 479-485.

Curves corresponding to minimum work sequences are extremal curves of the Euler differential equation of the problem of variational calculus for the minimum of plastic work done. Diagrams. (Q23)

727-Q. A More Fundamental Approach to Plastic Stress-Strain Relations. D. C. Drucker. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 487-491.

Loading surface or any of the customary yield curves for work-hardening or ideally plastic materials must be convex. Meaning of corners in such curves or vertices in the loading surfaces with special reference to problems of uniqueness. Diagrams. (Q23, Q27)

728-Q. On the Coincidence of Plasticity Solutions Obtained With Incremental and Deformation Theories. F. Edelman. Paper from "Proceedings of of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 493-498.

Investigation and results. 8 ref. (Q23)

729-Q. A Study in Photoplasticity. M. Hetenyi. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 499-502.

Experimental stress analysis on a material which, in addition to exhibiting appreciable birefringence under load, has a well-defined yield point and can undergo large deformations at nearly constant stress once the yield point is reached. The term photoplasticity is used to describe procedure. (Q25)

730-Q. Experimental Studies of Polyaxial Stress-Strain Laws of Plasticity. Bernard Budiansky, Norris F. Dow, Roger W. Peters, and Roland P. Shepherd. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 503-512.

Thin-walled cylinders of 14S-T4 Al alloy were stressed into the plastic range in axial compression and then twisted. Significance of the results with respect to stress-strain laws of plasticity. Graphs, tables. 21 ref. (Q23, Q27)

731-Q. Determination of Stress-Strain Curve in Shear by Twisting Square Plate. Walter Ramberg and James A. Miller. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 513-519.

Method which requires measurements of deflection or of extreme fiber bending strain in the center portion of a twisted square plate. 12 ref. (Q2)

732-Q. The Formation of a Necked Region and Fracture Along an Oblique Line in Flat Tensile Bars. Julius Aronofsky. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 521-532.

Investigation of the transition from the symmetrical-type neck to the oblique neck and oblique fracture. Method of characteristics of the hyperbolic partial differential equation is used to predict slip lines for the state of plane stress either uniaxial or biaxial. Photographs. 24 ref. (Q27)

733-Q. On Plastic-Rigid Solutions and Limit Design Theorems for Elastic-Plastic Bodies. D. C. Drucker, H. J. Greenberg, E. H. Lee, and W. Prager. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 533-538.

Limit load theorems, plastic-rigid type of analysis, and application of the limit load theorems to plastic-rigid solutions. Diagrams. 12 ref. (Q21, Q23)

734-Q. On the General Plane Problem of a Perfectly Plastic Body. Hilda Geiringer. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 539-545.

Three-dimensional and plane problems; characteristics; approximate solution of initial value problems; simple waves. 12 ref. (Q23)

735-Q. Limit Design of Plates. W. H. Pell and W. Prager. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 547-550.

Limit design of thin plates made of a perfectly plastic material which obeys the stress-strain law of Prandtl and Reuss. Method is given which furnishes bounds for the flow limit of such plates. 8 ref. (Q23)

736-Q. Approximate Methods in the Limit Design of Structures. J. Heyman and W. Nachbar. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 551-560.

Collapse of plane frames under concentrated loads is treated by approximate methods to obtain upper and lower bounds on the collapse factors. Techniques are extended to include cases of distributed loading. Diagrams, tables. 9 ref. (Q28)

737-Q. Plastic Flow in a Closed Ended Tube With Internal Pressure. R. Hill, E. H. Lee, S. J. Tupper. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 561-567.

Stress-strain relationship, theory of a thick closed tube under internal pressure, and finite difference solution for the plastic flow. Graphs. (Q23)

738-Q. Analysis of Rotating Disks of Arbitrary Contour and Radial Temperature Distribution in the Region of Plastic Deformation. S. S. Manson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 569-577.

Method for determining displacements; stress and strain distributions in rotating disks of arbitrary contour; and radial temperature distributions subjected to either partial or total plasticity. Validity of the method is established by favorable comparison of theoretical results with experimental data. Graphs. 12 ref. (Q23)

739-Q. Unsymmetrical Bending of Rectangular Beams Beyond the Elas-

tic Limit. M. S. Aghbabian and E. P. Popov. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 579-584.

Analysis of the behavior of rectangular beams subjected to unsymmetrical bending and stressed beyond the elastic limit. Experimental results with steel specimens verify the analytical work. (Q27, CN)

740-Q. A Theory for Combined Creep Strain-Stress Relations for Materials With Different Properties in Tension and Compression. Joseph Marin and Yoh-Han Pao. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 585-593.

Theory and results of experiments. Tables, graphs. (Q3, Q27)

741-Q. An Elementary Theory of Creep Buckling of Columns. D. Rosenthal and H. W. Baer. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 603-611.

Developed on the basis of a series of simplifying assumptions. Existence of a critical stress in creep buckling was demonstrated in a series of preliminary tests of short duration on 99.5% Al at 95° F. Graphs. 8 ref. (Q3, Al)

742-Q. Deflection of Members Subjected to Bending Accompanied by Creep. Joseph Marin and L. W. Hu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 613-618.

Semi-graphical method for determining creep deflections in members subjected to pure bending. Experimental results are compared with the theoretical results using the graphical method developed. Graphs, tables. (Q3, Q5)

743-Q. Theory of Creep in Pin-Jointed Structures. Robert C. Meacham. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 619-624.

How a geometric method can be employed to examine a pin-jointed truss structure made of a visco-elastic-plastic material. (Q3)

744-Q. Experimental Study of Inelastic Buckling of Columns of Varying Section. R. E. Newton. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 625-629.

Undertaken for the purpose of providing the necessary experimental data for a satisfactory theory. Experimental study was restricted to centrally-loaded, hinged-end, straight columns of compact section. Three materials having different stress-strain characteristics in compression were employed and two different types of section variation were studied. Graphs. 17 ref. (Q28, Al, Mg, ST)

745-Q. Influence of the Bauschinger Effect on Inelastic Bending of Beams. Omar M. Sidebottom and Che-Tyan Chang. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 631-639.

Investigation to determine the influence of the Bauschinger effect on reducing the magnitude of residual stresses in an inelastically deformed beam as well as on lowering the load-carrying capacity of such a beam when the sense of the load is reversed. Diagrams. (Q25, Q5, CN)

746-Q. Use of a Recrystallization Method to Study the Nature of Damage in Fatigue of Metals. G. M. Sinclair and T. J. Dolan. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 647-651.

Study to evaluate relative extent to which disruption of atomic bonds occurs during early stages of a fatigue test. Periodical reheating to the recrystallization temperature was employed as a means of removing the effects of work hardening developed by the repeated stressing. Test results. Tables. (Q7, Cu)

747-Q. Fatigue Tests of Single Crystals of Ingot Iron. Frank A. Mc Clintock. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 653-659.

Single crystals of ingot Fe were tested in a rotary bending fatigue machine and examined microscopically. Test results. Micrographs. 18 ref. (Q7, Fe)

748-Q. (English.) **X-Ray Studies of Polycrystalline Metals Deformed by Rolling. I. The Examination of the Harder Metals, Copper, Nickel and Iron.** P. Gay and A. Kelly. *Acta Crystallographica,* v. 6, pt. 2, Feb. 1953, p. 165-177.

Back-reflection with normal diameter and microbeam X-rays was used. Data were obtained on mode of deformation and nature of the cold worked state. Similarities were found for hard and soft metals. (Q24, M22, Cu, Ni, Fe, Sn, Zn, Pb Cd)

749-Q. (English.) **Preyield Plastic and Anelastic Microstrain in Low-Carbon Steel.** T. Vreeland, Jr., D. S. Wood, and D. S. Clark. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 414-421.

Results of an experimental investigation of an annealed low-carbon steel subjected to rapidly applied constant stresses less than the static upper yield stress. Sensitive measurements of plastic and anelastic microstrain were made. Relationship between stress and equilibrium microstrain was determined. Graphs. 13 ref. (Q23, Q22, CN)

750-Q. (English.) **Notes on Work Hardening and Recovery.** P. A. Beck. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 422-425.

Reviews literature and work. 34 ref. (Q23, N4)

751-Q. (English.) **Deformation of Symmetric Zinc Bicrystals.** J. J. Gilman. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 426-427.

Stress-strain data for a symmetric Zn bicrystal with a longitudinal boundary. Shows that the bicrystal deforms as if it were a monocrystal. Observations in terms of dislocation theory. (Q24, Zn)

752-Q. (English.) **The Plasticity and Fracture of Irradiated AgCl Single Crystals.** Yin-Yuan Li. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 455-456.

Changes produced in plastic and fracture properties of AgCl when irradiated with X-rays or ultraviolet light. (Q23, Q26)

753-Q. (English.) **Shear Along Glide Planes in Aluminum.** R. Maddin, E. H. Harrison, and R. W. Gelinas. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 460-464.

Experiments in which a cylindrical tricrystal of high-purity Al ½ × 6 in. was grown by the strain-anneal method. Surface preparation and shear values obtained. Graphs, micrographs. (Q2, Al)

754-Q. (English.) **The Formation of Lattice Defects During Slip.** H. G. van Bueren. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 464-465.

Experiments using deformed Al. (Q24, Al)

755-Q. (Czechoslovakian.) **Investigation of Fatigue Phenomenon With X-Rays.** Petr. Skulari. *Hutnické Listy,* v. 7, no. 9, 1952, p. 456-461.

Results show that a systematic study of interference ring changes may clarify transition from dangerous to safe loads. Photographs. 36 ref. (Q7, Al, Cu, Mg)

756-Q. (Czechoslovakian.) **Wear of Railroad Materials.** Frantisek Sicha. *Hutnické Listy,* v. 7, no. 9, 1952, p. 473-478.

Selection of materials for straight, rolling and gliding parts. Photographs, graphs, tables. 26 ref. (Q9, T23, Mn, Si, CN)

757-Q. (French.) **Martensitic White Cast Iron Resistant to Wear by Abrasion.** *Fonderie,* May 1953, p. 3444-3445.

Chemical composition, preparation, and testing. (Q9, CI)

758-Q. (French.) **Wear and Fatigue on Rails.** M. Ros. *Revue de Métallurgie,* v. 50, no. 6, June 1953, p. 389-409.

Results of laboratory investigations and service tests carried out on rails made from a single steel and on heat treated compound rails. Graphs, photographs. (Q9, Q7, ST)

759-Q. (German.) **Plastic Buckling of a Centrally Compressed Steel Bar.** P. Csonka. *Acta Technica Academiae Scientiarum Hungaricae,* v. 5, no. 2, 1952, p. 153-161.

Problem of steel bars whose stress diagrams consist of a straight line and a sinusoidal arc. Graphs. 6 ref. (Q28)

760-Q. (German.) **The Strain Gage Method. I. Principles of the Strain Gage and Its Accessories.** Chr. Rohrbach. *Archiv für technisches Messen,* no. 209, June 1953, p. 139-142.

Properties of strain-gage wires, bases, adhesives, and electrical leads, and conditions under which they should be used. Diagrams. 16 ref. (Q25)

761-Q. (German.) **Rheological Distribution Functions.** B. Gross. *Kolloid Zeitschrift,* v. 131, no. 3, June 1953, p. 161-168.

Creep and relaxation curves which describe viscoelastic processes are shown to be inadequately represented by the simple exponential equations of the elementary theory. Graphs, diagrams. 13 ref. (Q24)

762-Q. (German.) **Tests of Filler Rods for Acetylene Welding of Steel.** C. G. Keel. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 5, May 1953, p. 153-168.

Notch-impact strength, long-time alternating strength of weld metal, and alternating strength of welded butt joint. Safe stresses, confirmative tests, practical experience, gas content of weld metal, H_2 and its determination in weld metal, conclusions, and discussions. Photographs, graphs, diagrams. (Q6, Q23, K2, ST)

763-Q. (German.) **On Creep and Relaxation.** H. Umstätter. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 184-191.

Chemically related substances may have very different stress-strain diagrams while the stress-strain diagrams of chemically different substances may be quite similar. Graphs, diagrams. (Q3, Al, Cu, ST)

764-Q. (German.) **Behavior of Killed Low-Carbon Openhearth and Bessemer Steels During Hardness and Notch-Impact Testing.** Otto Hengstenberg and Walter Janiche. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 828-838.

Tests of properties in aged and unaged states. Graphs, tables. 68 ref. (Q29, Q6, ST)

765-Q. (German.) **The Effect of Stress Concentration on the Stability of Materials.** G. Sachs, W. F. Brown, Jr., and D. P. Newman. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 233-239.

Notch sensitivity seems to depend on time and temperautre for all materials. A definite ductility value cannot be given for smooth bars. Tables, graphs. 20 ref. (Q23)

766-Q. (German.) **Physical Processes During Alternate Stressing.** Ulrich Dehlinger. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 240-242.

Reason for disturbance is an athermal recovery process brought about by repeated slip within the crystals. Diagrams. 8 ref. (Q24)

767-Q. (German.) **A Uniform Hardness Test (Penetrating Hardness) With Cermet Specimens.** R. Mitsche. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 27-37; disc., p. 38.

Penetrators employed were either balls (Brinell), cones (Ludwik, Rockwell), or pyramids (Vickers). Materials ranged from Al to fully hardened steels. Graphs. 15 ref. (Q29. ST, Al)

768-Q. (German.) **Some New Points on the Strength of Alloys.** G. M. Schwab. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 49-63; disc., p. 63-64.

Temperature coefficient of the Brinell hardness of metals can be represented by a bi-exponential formula, leading to the assumption of two different processes with different activation energies. Brinell hardness of the phases α, β, γ, ε, η of the Hume-Rothery systems, Cu-Zn, Cu-Sn, Ag-Zn, and Ag-Cd, is measured between 20 and 450° C. in a special apparatus. Tables, graphs, diagrams. 22 ref. (Q29, Cu, Zn, Sn, Ag, Cd)

769-Q. (German.) **The Base for Friction of Solid Bodies.** R. Walzel. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 100-105; disc., p. 105.

Wear process is considered as being due to friction forces in excess of the tensile and shear strength of the surface layer. Correlates various factors involved. Special conditions determining the wear of sintered materials. Diagrams. (Q9)

770-Q. (German.) **A System for Cermet Standardization.** C. Ballhausen. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 221-231; disc., p. 231.

Properties of hard metal alloys are plotted as space coordinates on a rectangular base having the volume ratio WC:TiC as abscissa and the Co content in area-percent as ordinate. Data on compressive strength, modulus of elasticity, hardness, modulus of rupture, coefficient of thermal expansion, and cutting characteristics are plotted for WC-TiC-Co-base hard metals. Diagrams, tables.
(Q general, H11, W, Ti, C)

771-Q. (Italian.) **Stresses in Disks With an Elliptical Hole Which Are Subjected to External Pressure.** Giuseppe Manzella. *Tecnica Italiana,* v. 8, no. 2, Mar. 1953, p. 81-84.

Photo-elastic studies. Diagrams, graphs, photograph. 5 ref. (Q25)

772-Q. (Russian.) **Influence of Manganese on Mechanical Properties of Welded Seams and the Tendency Toward Hot Cracking.** E. D. Lonskii. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 5-7.

Explains above by increase of C content in built-up metal and not by increase of Mn content. Experiments. Tables, graphs. 1 ref.
(Q general, K9, Mn)

773-Q. (Russian.) **Seizing of Metals With Simultaneous Plastic Deformation.** A. P. Semenov. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 1, Sept. 1, 1952, p. 125-128.

Local deformation caused by friction on surfaces of metals. Equipment.
(Q9, Al, Pb, Cu, Cd, Sn, Ni, Zn)

774-Q. (Russian.) **Physical Nature of Fatigue.** L. A. Glikman and V. P. Tekst. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 699-701.

Mechanical and X-ray tests were made on stainless and carbon steel specimens at various stages of fatigue damage. Graphs. 3 ref.
(Q7, CN, SS)

775-Q. (Russian.) **Most Advantageous Fiber Direction in Products From Anistropic Materials.** V. K. Grigorovich, N. D. Sobolev, and Ia. B. Fridmann. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 4, Oct. 1, 1952, p. 703-706.

Harder materials were found to have more anisotropy of mechanical properties than soft materials. Tests were made on alloy steel. Graphs, diagrams. 9 ref. (Q general, AY)

776-Q. (Russian.) **Electron-Microscopic Investigation of Slip Bands.** R.

E. Garber and A. E. Kovalev. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952, p. 901-903.

Rock salt crystals were used to study the formation of slip bands. Micrographs. 9 ref. (Q24, M21)

777-Q. (Russian.) **Investigation of the Rule of Variation of the Intensity of X-Ray Interferences for Deformed Irons.** V. A. Ilina and V. K. Kritskaia. *Doklady Akademii Nauk, SSSR,* v. 87, new ser. no. 2, Nov. 11, 1952, p. 207-210.

Measured intensity of 19 X-ray reflections from deformed and nondeformed Fe in Mo K alpha-radiation. Tables, graphs. 10 ref. (Q24, Fe)

778-Q. (Russian.) **Abrasive Wear of Metals at Various Temperatures and Speeds.** G. I. Kiselev. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 5, Dec. 11, 1952, p. 735-737.

Experiments on grinding of pure Cu and Zn and simple carbon steels with 0.20, 0.45, 0.60 and 1.2% C. Graphs. 7 ref. (Q9, G18, Cu, Zn, CN)

779-Q. (Russian.) **Measurement of Internal Pressure Arising in Polymorphic Metals During Heating.** E. N. Savitskii and V. F. Terekhova. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 787-789.

Apparatus and methods for measuring internal stresses arising during phase transformations. Armco Fe and Mn were tested. Graphs. (Q25, N general, Fe, Mn)

780-Q. (Russian.) **Effect of Stress Frequency on Fatigue Strength of Steel During Service in Surface Active and Corrosive Media.** G. V. Karpenko. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 797-800.

Experiments and results of fatigue tests using pure bending. Graphs. 6 ref. (Q7, R1, ST)

781-Q. (Russian.) **Physical Meaning of Stress Invariants Used in the Theory of Plasticity.** V. V. Novozhilov. *Prikladnaia Matematika i Mekhanika,* v. 16, no. 5, Sept.-Oct. 1952, p. 617-619.

Taking a sphere as elementary volume, author finds the invariant for the tangential stress, which permits an interpretation of yield criteria. 5 ref. (Q23)

782-Q. (Russian.) **Effect of the Temper Carbon in Mechanical Properties of Malleable Iron.** I. I. Kharoshev. *Sel'khozmashina,* no. 8, Aug. 1952, p. 28-30.

Tensile strength was reduced by 3 to 4.5 kg. per sq. mm. and the elongation increased by 2 to 6% depending on the annealing conditions. The pearlite case thickness showed a decisive effect on the properties. (Q23, CI)

783-Q. (Russian.) **Hardening of Cutting Tools by Cold Hardening With Shot.** N. A. Karasev. *Stanki i Instrument,* v. 23, no. 10, Oct. 1952, p. 27-29.

Metallographic examination of the hardened layers of high-speed and carbon toolsteels. Diagrams, graphs, photographs. (Q29, G23, TS)

784-Q. (Russian.) **Plasticity in Creep Conditions and a Mechanism of Precipitation Hardening.** V. I. Prosvirin. *Vestnik Mashinostroeniia,* v. 33, no. 1, Jan. 1953, p. 42-47.

Theoretical discussion of plasticity and creep. (Q23, Q3, N7, AY)

785-Q. (Russian.) **Deformability of Magnesium Alloys.** S. I. Gubkin, M. I. Zatulovskii, L. N. Moguchii, S. S. Volkov, M. D. Desiatkov, A. P. Frolov, and N. T. Krasnov. *Vestnik Mashinostroeniia,* v. 33, no. 1, Jan. 1953, p. 47-53.

Forgability was studied. Results in curves and tables. Concludes that Mg alloy can replace Al alloys for parts not subject to heavy loads in service. 9 ref. (Q24, Mg, Al)

786-Q. Designing Cylinders and Struts for Maximum Strength. B. Saelman. *Machine Design,* v. 25, Aug. 1953, p. 133-138.

Cylinder tubes in hydraulic actuators designed for minimum weight have a definite practical limit of strength beyond which no advantage can be gained. General cases of tubes in bending and tubular columns. Diagrams. (Q23)

787-Q. A Method of Illumination for the Photography of Markings on Large Flat Areas of Sheet. A. Loro. *Metallurgia,* v. 48, no. 285, July, 1953, p. 48-50.

Method used to photograph stress-strain markings. Diagrams, photographs. (Q25)

788-Q. Some Problems on the Theory of Creep. Y. N. Rabotnov. *National Advisory Committee for Aeronautics,* Technical Memorandum 1353, Apr. 1953, 19 p.

Translated from *Vestnik Moskovskovo Universiteta,* no. 10, 1948, p. 81-91. A theory of creep is proposed which represents an extension of the theory of elastic heredity of Volterra to plastic deformation. Graphs. 3 ref. (Q3, Q24, Cr, Ni, Mo, ST)

789-Q. Combined-Stress Fatigue Strength of 76S-T61 Aluminum Alloy With Superimposed Mean Stresses and Corrections for Yielding. William N. Findley. *National Advisory Committee for Aeronautics,* Technical Note 2924, May 1953, 90 p.

Fatigue data for 76S-T61 Al for several combinations of bending and torsion with both alternating and

mean stresses. Graphs, photographs, tables, diagrams. 66 ref. (Q7, Al)

790-Q. Strength Analysis of Stiffened Thick Beam Webs With Ratios of Web Depth to Web Thickness of Approximately 60. L. Ross Levin. *National Advisory Committee for Aeronautics,* Technical Note 2930, May 1953, 11 p.

Experimental investigation of the strength of plane diagonal-tension webs. Tables, diagrams, photograph. (Q23, Al)

791-Q. The Creep of Single Crystals of Aluminum. R. D. Johnson, F. R. Shober, and A. D. Schwope. *National Advisory Committee for Aeronautics,* Technical Note 2945, May 1953, 51 p.

An investigation of the creep in metals in the range from room temperature to 400° F. Graphs, photographs, diagrams, tables. 29 ref. (Q3, Al)

792-Q. Creep-Buckling Analysis of Rectangular-Section Columns. Charles Libove. *National Advisory Committee for Aeronautics,* Technical Note 2956, June 1953, 24 p.

Creep behavior of a slightly curved solid rectangular-section column. Diagrams, graphs. 6 ref. (Q3, Al)

793-Q. Structural Efficiencies of Various Aluminum, Titanium and Steel Alloys at Elevated Temperatures. George J. Heimerl and Philip J. Hughes. *National Advisory Committee for Aeronautics,* Technical Note 2975, July 1953, 16 p.

Efficient temperature ranges are indicated for two high-strength Al alloys, two Ti alloys, and three steels for some short-time compression-loading applications at elevated temperatures. Analysis covers strength under uniaxial compression, elastic stiffness, column buckling and buckling of long plates in compression or in shear. Graphs. (Q28, Al, Ti, ST)

794-Q. (English.) **The Brittle Fracture of Metals.** E. O. Hall. *Journal of the Mechanics and Physics of*

Investigation on single-crystal and polycrystal cleavage surfaces. Depth of plastic zone. Graphs, micrographs. 16 ref. (Q26)

795-Q. (English.) **The Yield Stress of Pure Lead in Compression.** N. Loizou and R. B. Sims. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 234-243.

Variation of yield stress of pure Pb in uniaxial compression with temperature, strain and strain rate. Experiments designed to test accuracy of the results. Graphs, photographs, tables. 5 ref. (Q23, Pb)

796-Q. (English.) **A New Method for Determining the Yield Criterion and Plastic Potential of Ductile Metals.** R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 271-276.

Use of obliquely notched or grooved strips to obtain a long narrow zone of distortion. Diagrams, graph. 9 ref. (Q23)

797-Q. (English.) **Experiments With a Laboratory Extrusion Apparatus Under Conditions of Plane Strain.** N. W. Purchase and S. J. Tupper. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 277-283.

Experiments with a small-scale extrusion apparatus; results compared with theory of extrusion due to Hill (1948). Diagrams, graphs, table, photographs. 3 ref. (Q24, F24)

798-Q. (English.) **A Note on a Test of the Plastic Isotropy of Metals.** H. Ll. D. Pugh. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 284-286.

Evidence that a simple type of anisotropy will satisfy test conditions in work on plastic distortion of metals. (Q24)

799-Q. (English.) **Investigation of Stress Waves in Cylindrical Steel Bars by Means of Wire Strain Gauges.** S. Petersson. *Kungl. Tekniska Högskolans Handlingar (Transactions* of the Royal Institute of Technology, Stockholm, Sweden), no. 62, 1953, 21 p.

Propagation of stress waves was studied over the range of frequencies of practical importance. Photographs, diagrams, tables. 7 ref. (Q25, ST)

800-Q. (English.) **A Geometrical Discussion of the Slip Line Field in Plane Plastic Flow.** William Prager. *Kungl. Tekniska Högskolans Handlingar (Transactions* of the Royal Institute of Technology, Stockholm, Sweden), no. 65, 1953, 25 p.

Geometrical discussion including basic relations. Diagrams. 9 ref. (Q24)

801-Q. (German.) **A Theory of Creep in Single Crystals.** O. G. Folberth and A. Kochendörfer. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 244-257.

Extensions of creep laws to cover plastic behavior from creep to impact deformation. Graphs. 27 ref. (Q3, Q6)

802-Q. (French.) **Spherodized Cast Iron, Its Properties and Recent Progress.** G. Mohr. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 375-377.

Mechanical properties are tabulated and compared with values of gray cast iron and cast steel. Photographs, diagrams, tables. (Q general, CI)

803-Q. (French.) **Internal Disorientations on Monocrystals of Al-3% Mg Solid Solution Deformed by Cold Rolling.** J. Herenguel, P. Lelong, and P. Lacombe. *Revue de Métallurgie,* v. 50, no. 3, Mar. 1953, p. 170-175; disc., p. 175-176.

Mechanism of the formation of deformation bands in favorable orientations. Photographs, diagrams. 7 ref. (Q24, Al)

804-Q. (French.) **Study of a Statistical Interpretation of Fatigue Tests.** R. Girschig. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 248-252.

Application of statistical methods to determine practical fatigue limits for various materials and specimens. Desirable experimental procedures. Graphs. (Q7)

805-Q. (French.) **Contribution to the Study of the Band Structure in Forged Steel. Combined Influence of Minor Segregation, Carbon Diffusion and Heat Treatment.** P. Cattier, Ch. Dubois, J. Bleton, and P. Bastien. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 275-290; disc., p. 290.

Distribution of inclusions depends on the more or less hardened structure of the band as the result of carbon diffusion. Photographs, graphs, tables. 6 ref. (Q24, J general, AY)

806-Q. (French.) **Contribution to the Statistical Study of Scatter in the Results of Rotating Bend Tests.** R. Cazaud. *Revue de Métallurgie,* v. 50, no. 4, Apr. 1953, p. 291-296.

Study of factors determining scatter in the results of fatigue tests. Tables, graphs, diagrams. 11 ref. (Q7)

807-Q. (French.) **New Methods of Analysis and Design of Constructions in the Plastic Range.** J. F. Baker and M. R. Horne. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 326-336.

Two methods for calculating metallic structures based on the plastic behavior of the steel. Charts. 10 ref. (Q23)

808-Q. (German.) **Bending and Buckling Stresses in Conformance to DIN 4114, Tentative Standard Specification —"Light Metals in Building Structure".** J. Weinhold. *Aluminium,* v. 29, no. 6, June 1953, p. 248-254.

Allowable stresses for designing one-piece struts of constant cross section. Safety standards are met. Graphs, diagrams, tables. 7 ref. (Q5, T26, EG-a)

809-Q. (German.) **The Shear Difference Method for the Complete Determination of Two-Dimensional Stress Distributions by Photo-Elasticity.** R. Albrecht. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 19, Ausgabe B. no, 1, 1953, p. 17-23.

Fundamentals as applied to frame corners which are submitted either to pure bending or to bending with additional lateral forces. Diagrams, graphs, photographs, tables. (Q6, Q25)

810-Q. (German.) **Tests of Flow Properties by Simple Mechanical Models.** Ernst Mewes. *Kolloid-Zeitschrift,* v. 131, no. 2, May 1953, p. 84-88.

Demonstrates various forms of deformation behavior by means of models. Diagrams. 4 ref. (Q24)

811-Q. (German.) **Relationship Between Ludwig Hardness and Flow Curve, With Aid of Energy Balance.** R. Boklen. *Metall,* v. 7, nos. 11/12, June 1953, p. 436-441.

Derives equation for relationship, using only one empirical value. Equation is applied to specific cases. Graphs, photographs, tables. 24 ref. (Q29, Q24, Fe, ST, Al, Cu)

812-Q. (German.) **Hardness Testing of Cast Copper Alloys.** P. Melchior. *Metall,* v. 7, nos. 11/12, June 1953, p. 433-436.

Three sec. are wholly adequate for loading interval in Brinell hardness test. Tables, photographs, graphs. (Q29, Cu)

813-Q. (Hungarian.) **Wear Tests on Railway Brake Shoes Made of Gray Cast Iron. I.-III.** Endre Fule. *Öntöde,* v. 4, no. 1, Jan. 1953, p. 6-12; no. 2, Feb. 1953, p. 39-44; no. 3, Mar. 1953, p. 56-62.

Wear resistance tests with special consideration of relative wear values. Results evaluated statistically. The relative life of brake shoes is calculated. Tables, graphs. (Q9, CI)

814-Q. (Hungarian.) **Cast Iron Containing Copper.** Nandor Hajto and Ferenc Varga. *Öntöde,* v. 3, no. 6, June 1952, p. 121-129.

Experiments for the purpose of establishing the change in mechanical properties caused by additions of Cu. Results. Tables, graphs, photographs. 11 ref. (Q general, CI)

815-Q. (Italian.) **Considerations and Experimental Data Regarding a New Light Alloy for Bearing Materials on the Basis of Al-Sn-Ti.** N. Collari and L. Paglialunga. *Alluminio,* v. 22, no. 1, Jan. 1953, p. 22-27.

Mechanical properties. Diagrams, tables, graphs. 13 ref. (Q general, Al, SG-c)

816-Q. (Italian.) **Measuring the Velocity of Elastic Waves in Solids at Elevated Temperatures.** P. G. Bordoni and M. Nuovo. *Nuovo Cimento,* v. 10, ser. 9, no. 4, Apr. 1, 1953, p. 386-394.

Velocities were determined as functions of temperature for five pure metals. Tables, graphs. 10 ref. (Q21, Pb, Sn, Bi, Al, Cd)

817-Q. (Russian.) **Investigation of Local Plastic Deformation Under Active Tension.** I. A. Oding and V. S. Ivanova. *Izvestiia Akademii Nauk SSSR; Otdelenie Tekhnicheskikh Nauk,* no. 1, Jan. 1953, p. 96-105.

Distribution of plastic deformation along a tensile specimen was investigated by X-rays. Local deformation decreased with an increase of total deformation. Photographs, tables, graphs. 7 ref. (Q24, ST)

818-Q. Banded Structures In Steels. D. G. Walker. *Australasian Engineer,* May 7, 1953, p. 63-69.

Paper presented before The Australian Institute of Metals, Melbourne Branch, Physical Metallurgy Division, Oct. 9, 1952. Nature and origin of various types of banded segregation in steels. Attention is concentrated on "eutectoid banding". Its origin is discussed in terms of alloy, slag, and dynamic segregation. Micrographs. 45 ref. (Q24, ST)

819-Q. Creep-Resisting Magnesium Alloy. *Engineer,* v. 196, July 31, 1953, p. 143.

Composition and properties of Mg-Th-Zn alloy. Graphs. (Q3, Mg)

820-Q. Vibrating-Wire Strain Gauge for Use in Long-Term Tests on Structures. R. J. Mainstone. *Engineering,* v. 176, July 31, 1953, p. 153-156.

Design and operation of apparatus. Diagrams, photographs. 10 ref. (Q25)

821-Q. A Theory of Work-Hardening of Metals. II. Flow Without Slip-Lines, Recovery and Creep. N. F. Mott. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 742-765.

"Fine slip", thermal recovery of cold-worked metals, and rate of diffusion in materials undergoing creep. Describes logarithmic, Andrade's β, and steady-state creep in terms of dislocation movement. (Q3, Q24)

822-Q. Tensile Testing at High and Low Temperatures. K. W. Mitchell. *Product Engineering,* v. 24, Aug. 1953, p. 197-203.

Describes tests and plots stress-strain curves. Graphs, tables, diagrams. 7 ref. (Q27, Fe, AY)

823-Q. A Simple Model for Demonstrating the Effect of Dislocations on the Strength of Crystals. P. Feltham and C. F. Goodeve. *Research,* v. 6, Aug. 1953, p. 46S-47S.

Simplified model using springs and magnets. Photograph. 8 ref. (Q23, M26)

824-Q. How Metals Wear. *SAE Journal,* v. 61, Aug. 1953, p. 23-25.

Excerpts from "Mechanism of Wear" by W. E. Jominy, presented at the SAE Annual Meeting, Detroit, Jan. 13, 1953. Types of wear and importance of lubrication. Diagrams. (Q9)

825-Q. Directionality in Rolled Copper and Brass. G. L. J. Bailey. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 675-679.

Nature, causes and cures of directionality. Tables, diagrams, photograph. (Q24, Cu)

826-Q. Some Aluminum-Copper-Silicon Alloys. An Examination of Their Tensile Properties and Oxy-Acetylene Welding Characteristics. W. I. Pumphrey. *Welding Research,* v. 7, June 1953, p. 65-67.

Includes tables, graph. (Q25, K2, Al)

827-Q. (French.) **Measurements of Local Deformations and Calculation of Welding Stresses on Two Sides of the Floor Plates of Two Ships Under Construction.** R. Spronck and J. J. L. van Maanen. *Revue de la Soudure* (Brussels), v. 9, no. 2, 1953, p. 88-115.

Methods and test data. (Concluded.) (Q25, K general, ST)

828-Q. (German.) **Processes in Age Hardening.** A. Rühenbeck. *Aluminium,* v. 29, no. 6, June 1953, p. 254-255.

Observes Brinell-hardness variations of Al-Mg-Si alloy parts as cold deformed and after solution treating, quenching and tempering. Graphs. (Q29, J28, Al)

829-Q. (Pamphlet.) **A Comparative Investigation on the Fatigue Strength at Fluctuating Tension of Several Types of Riveted Lap Joints, a Series of Bolted and Some Series of Glued Lap Joints of 24S-T Alclad.** A. Hartman and G. C. Duyn. National Luchtvaartlaboratorium (Nat. Aero. Res. Inst.), Amsterdam, Report No. M 1857, 26 p.

Results of fatigue tests at fluctuating tension on various standard types of joints. Tables, graphs, photographs. 4 ref. (Q7, Al)

830-Q. (Book.) **Materials of Engineering.** Ed. 8. H. F. Moore and Mark B. Moore. 372 p. McGraw-Hill, 330 W. 42nd St., New York 36, N. Y. $6.00.

Includes recent information given by the electron microscope and a discussion of resistance to fatigue by metals under compressive loads. Metal data on B and Ti bring the section on metals up to date. A tabulation of physical properties of numerous plastics is included. (Q general)

831-Q. (Book.) **Proceedings of the First U. S. National Congress of Ap-**

plied Mechanics. 965 p. 1952. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.
Consists of papers, abstracted separately, which were presented in Chicago, June 11-16, 1951.
(Q general)

832-Q. (Book.) **Symposium on Fatigue With Emphasis on Statistical Approach. II.** 91 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. $2.00.
Includes "The Statistical Behavior of Fatigue Properties of SAE 4340 Steel Forgings", J. T. Ransom and R. F. Mehl; "The Statistical Behavior of Fatigue Properties and the Influence of Metallurgical Factors", E. Epremian and R. F. Mehl; "A New Interpretation of the Understressing Factor", E. Epremian and R. F. Mehl, and "Fatigue Properties of Larger Specimens With Related Size and Statistical Effects", O. J. Horger and H. R. Neifert. (Q7)

833-Q. Stress Measurements and Service Tests of Manganese Steel Castings in the Crossings at McCook, Ill. *American Railway Engineering Association, Bulletin,* v. 55, no. 509, June-July 1953, p. 1-36.
Results of stress measurements for two new designs of castings and service tests of all castings. Diagrams, photographs, graphs. (Q25, CI)

834-Q. Investigation of Dead-Load and Live-Load Stresses in a 350-Ft. Truss Span on the AT&SF System. *American Railway Engineering Association, Bulletin,* v. 55, no. 509, June-July 1953, p. 37-132.
Tables, diagrams, graphs. (Q25, CN)

835-Q. Thermal Shock and Other Comparison Tests of Austenitic and Ferritic Steels for Main Steam Piping. A Summary Report. W. C. Stewart and W. G. Schreitz. *ASME Transactions,* v. 75, Aug. 1953, p. 1051-1067; disc., p. 1068-1072.
Thermal shock and mock-up tests. High temperature mechanical properties. Graphs, diagrams, tables, photographs. 8 ref. (Q general, SS)

836-Q. On the Validity of Assumptions Made in Theories of Plastic Flow for Metals. Joseph Marin and L. W. Hu. *ASME, Transactions,* v. 75, Aug. 1953, p. 1181-1186; disc., p. 1186-1190.
Results of a series of special biaxial-stress tests. Stresses were introduced in a tubular specimen by applying internal pressure and axial tension. Hot rolled 14S-T6 was tested. Diagrams, graphs, photograph. 5 ref. (Q24, Al)

837-Q. Research on the Aluminium-Silicon-Zinc System Alloys for Castings. Shigeo Oya. *Castings Research Laboratory, Report,* no. 4, 1953, p. 27-29.
Mechanical properties of the Al alloys in the range of 4-25% Zn and 0.20% Si contents. (Q general, Al)

838-Q. Etching Method for the Fatigue of Mild Steel. II. Hiroshi Yamanouchi and Takeshi Inukai. *Castings Research Laboratory, Report,* no. 4, 1953, p. 50-51.
Phenomena of fatigue. Research on change of mechanical properties in fatigue tests. Graphs. (Q7)

839-Q. Wear Resistance Property of Chromized Low Carbon Steel. Shigetomo Ueda. *Castings Research Laboratory, Report,* no. 4, 1953, p. 55-57.
Photograph, diagrams, graphs, table. (Q9, CN)

840-Q. Study on Young's Modulus (E) of Non-Ferrous Metals and Alloys. I. Ichiro Iitaka and Toshimasa Morooka. *Castings Research Laboratory, Report,* no. 4, 1953, p. 58-59.
Values for brasses in cold worked and heat treated states. Graphs, tables, photograph. (Q21, Cu)

841-Q. Some Problems in Flexural Testing. F. A. Blakey. *Engineer,* v. 196, July 24, 1953, p. 98-100.
Analysis relating to possible errors caused by lack of conformity of behavior of the testing apparatus with assumptions made about it. Graphs. 5 ref. (Q5)

842-Q. The Stability and Strength of Thin-Walled Steel Struts. A. H. Chilver. *Engineer,* v. 196, Aug. 7, 1953, p. 180-183.
Compression strength of steel channel sections. Photographs, graphs, diagrams, tables. 7 ref. (Q28, ST)

843-Q. Stresses in a Curved Beam. A. D. Richards. *Engineering,* v. 176, July 24, 1953, p. 103-105.
Method of determining the skin stresses in a beam curved in the plane of the applied moment, where the depth of beam is comparable with the initial radius of curvature. Tables, diagrams. (Q25)

844-Q. The Significance of the Izod Test With Regard to Gear Design and Performance. J. E. Russell, and W. T. Chesters. *Engineering,* v. 176, Aug. 7, 1953, p. 166-169.
Shock loading of gears. Graphs, photographs, tables. 8 ref. (Q6, ST)

845-Q. How to Get More From Your Tool Steels. L. H. Seabright. *Iron Age,* v. 172, Aug. 27, 1953, p. 104-108.
Evaluates testing methods for toolsteels. Tables, graphs. (Q general, TS)

846-Q. Effect of Composition on the Warm-Working Characteristics of

Austenitic Alloys. G. T. Harris and H. C. Child. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 325-330.

Effects of base composition, additions of carbon and carbide-forming elements, and heat treatments on stress-rupture properties. Graphs, tables. 5 ref. (Q4, AY)

847-Q. Friction and Boundary Lubrication. A. C. West. *Lubrication Engineering,* v. 9, Aug. 1953, p. 211-217.

Presented at ASLE 8th Annual Meeting, Boston, April 15, 1953. Mechanism of sliding friction under conditions of dry metallic contact and boundary lubrication. Diagrams, micrographs. 77 ref. (Q9)

848-Q. A Summary of Hardness Testing Techniques. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 1, 1953, p. 117-121.

Description of Brinell, Vickers, Rockwell and Avery tests. Diagrams. (Q29)

849-Q. Metallurgy in the Mechanical Spring Industry. I. Flat Springs. II. Round Wire for Springs. *Mainspring,* v. 15, June 1953, Aug. 1953, unpaged.

Properties of typical spring steels. (Q general, CN)

850-Q. 81B40. Robert N. Imhoff and James W. Povnter. *Metal Progress,* v. 64, July 1953, p. 65-71.

Metallurgical characteristics of 81B40 steel. Includes hardenability, tensile and impact properties, brittleness, fracture types and fatigue tests. Graphs, photographs, tables. (Q23, Q6, Q26, Q7, J26, AY)

851-Q. Creep Resistance of Wrought Carbon Steel. C. H. M. Jenkins and H. J. Tapsell. *Metal Progress,* v. 64, July 1953, p. 130, 132, 134.

Condensed from "Factors Influencing the Creep Resistance of Wrought Carbon Steels", from *Journal of the Iron & Steel Institute.* See item 898-Q, 1952. (Q3, CN)

852-Q. Creep Resisting Ferritic Steels. H. W. Kirby. *Metal Progress,* v. 64, July 1953, p. 134, 136.

Digest of "Creep Resisting Ferritic Steels for Gas Turbines", from *Alloy Metals Review,* v. 8, Dec. 1952, p. 2-6, published by High Speed Steel Alloys Ltd., Widnes, Lancashire, England. Advantages of ferritic steel forgings. (Q3, AY)

853-Q. Ductile Chromium. E. F. Becht. *Metal Progress,* v. 64, July 1953, p. 198.

Digest of "Low Temperature Crystallography of Chromium", Technical Note WCRT 53-69, Apr. 10, 1953, Materials Laboratory, Wright Air Development Center, Dayton. Explanattons of ductility of Cr at temperature of liquid air. (Q23, Cr)

854-Q. Cleavage Fracture of Zinc Single Crystals. A. E. Deruyttere and G. B. Greenough. *Nature,* v. 172, July 25, 1953, p. 170-171.

Validity of the normal stress law. Graph. 3 ref. (Q26, Zn)

855-Q. The Mechanism of Stress Birefringence in Amorphous Solids. J. E. H. Braybon. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 617-621.

Resin specimens were used to check theoretical predictions. 8 ref. (Q25)

856-Q. The Surface Deformation Caused on Iron Crystals by Unidirectional Abrasion. R. P. Agarwala and H. Wilman. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 717-719.

Electron diffraction was used to examine electropolished specimens. Diagram. 6 ref. (Q24, Q9, M22, Fe)

857-Q. Unsymmetrical Bending and Bending Combined With Axial Loading of a Beam of Rectangular Cross Section Into the Plastic Range. Anthony J. Barrett. *Royal Aeronautical Society, Journal,* v. 57, Aug. 1953, p. 503-509.

Graphs. (Q5)

858-Q. Mechanical Testing Is Standardized. *Steel,* v. 133, Aug. 31, 1953, p. 75, 91-92.

Data on tension, bend and hardness tests. (Q27, Q5, Q29, S22, ST)

859-Q. Surface Conditions and Mechanical Properties. I.-II. Howard E. Boyer. *Steel Processing,* v. 39, July 1953, p. 330-334; Aug. 1953, p. 383-385, 407.

How tensile strength, elongation, reduction of area, impact strength, corrosion resistance, and heat resistance are dependent on composition and grain structure of steels. Testing methods and effects of heat treatment. Photographs, micrographs, graphs.
(Q23, J general, R general, ST)

860-Q. Design of Modern Welded Ships. An Outline of General Principles. W. G. Warren. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 277-280.

Tendency for premature failure of welded structure. Diagrams.
(Q general, K general, CN)

861-Q. (Norwegian.) **Brittle Fracture and Notch-Impact Test.** Alf Taraldsen. *Teknisk Ukeblad,* v. 100, no. 26, June 25, 1953, p. 557-558.

Theories. (Q23, Q6)

862-Q. Jet Metals. Wilson G. Hubbell. *Aeronautical Engineering Review,* v. 12, Sept. 1953, p. 31-36.

Oxidation resistance, high-temperature strength, and corrosion resistance of Cr, Ni and Co-based alloys and steels. Photographs, graphs. (Q23, R2, R general, SS, Ni, Co)

863-Q. Structural Comparison of Perforated Skin Surfaces With Other Means of Effecting Boundary-Layer Control by Suction. Charles B. Cliett. *Aeronautical Engineering Review,* v. 12, Sept. 1953, p. 46-54.

Tensile and shear strength tests on perforated Al alloy sheets. Graphs, tables, diagrams. 16 ref. (Q23, Q2, Al)

864-Q. How to Understand Alloy Steels. Samuel Storchheim. *American Machinist,* v. 97, Aug. 31, 1953, p. 105-114.

Relationship of alloy steel to plain carbon steel. Desecribes alloy properties in terms of the standard classification. (Q general, AY, CN)

865-Q. Delayed Yielding in Annealed Low-Carbon Steel Under Compression Impact. J. E. Johnson, D. S. Wood, and D. S. Clark. *American Society for Testing Materials,* Preprint no. 70, 1953, 10 p.

A study of the delay time for the initiation of yielding in an annealed low-C steel under longitudinal compression impact. Graphs, diagrams. 3 ref. (Q6, Q28, CN)

866-Q. Influence of Grain Size on Fatigue Notch-Sensitivity. R. W. Karry and T. J. Dolan. *American Society for Testing Materials,* Preprint no. 72, 1953, 13 p.

A study of the reduction in flexural fatigue strength caused by a circumferential notch in specimens of a single-phase metal. Graphs, tables. 14 ref. (Q7, Cu)

867-Q. The Influence of Strain Rate and Temperature on the Strength and Ductility of Mild Steel in Torsion. C. E. Work and T. J. Dolan. *American Society for Testing Materials,* Preprint no. 65, 16 p.

Effect of elevated temperature and rate of strain. Graphs, photograph. 20 ref. (Q23, CN)

868-Q. The Measurement of Directional Strength in Straight and Cross-Rolled Strip Steel by the Navy Tear Test. Helen D. Hoover. *American Sociey for Testing Materials,* Preprint no. 69, 1953, 17 p.

Measures the directional differences that are known to exist between the two rolling types. Graphs, tables, photographs. 4 ref. (Q23, ST)

869-Q. Properties and Behavior of a High-Strength Rivet Steel. Frank Baron and Edward W. Larson, Jr. *American Society for Testing Materials,* Preprint no. 64, 1953, 13 p.

Mechanical properties of high-strength rivet steel. Graphs, tables, diagrams. 6 ref. (Q general, CN)

870-Q. Report of Committee A-1 on Steel. N. L. Mochel, chairman. *American Society for Testing Materials,* Preprint no. 1, 1953, 50 p.

Work on production testing of steel products. Outlines 46 recommendations made by the committee. Tables, diagrams, photographs, graphs. (Q general, S22, ST, CN)

871-Q. Report of Committee E-9 on Fatigue. R. E. Peterson, chairman. *American Society for Testing Materials,* Preprint no. 59, 1953, 1 p.

Activities on research, papers, survey and large machines. (Q7)

872-Q. Report of Joint Committee on the Effect of Temperature on the Properties of Metals. F. B. Foley and V. T. Malcolm, chairmen. *American Society for Testing Materials,* Preprint no. 62, 1953, 4 p.

Activities of panels and subcommittees on mechanical properties of metal. (Q general)

873-Q. Strength Properties of Rolled Aluminum Alloys Under Various Combinations of Alternating and Mean Axial Fatigue Stresses. B. J. Lazan and A. A. Blatherwick. *American Society for Testing Materials,* Preprint no. 74, 1953, 15 p.

Fatigue data on 14S-T6, 24S-T4 and 75S-T6 Al alloys tested under various conditions of mean and alternating axial stress. Graphs, table. 19 ref. (Q7, Al)

874-Q. Time-Temperature Dependence of the Notch Effect and Influence of Notch Depth in Stress Rupture Tests on a Cr-Mo-V Steel. D. P. Newman, M. H. Jones, and W. F. Brown, Jr. *American Society for Testing Materials,* Preprint no. 68, 1953, 13 p.

Series of tests designed to yield information on the time-temperature dependence of the notch effect on this low-alloy steel. Graphs. 12 ref. (Q4, AY)

875-Q. Creep and Recovery in Metals. A. J. Kennedy. *British Journal of Applied Physics,* v. 4, Aug. 1953, p. 225-233.

Nature of creep and recovery mechanisms in single crystal and polycrystalline metals. Character of creep when periods of recovery, under reduced stress, are interposed. Graphs. 126 ref. (Q3)

876-Q. Influence of Striations on the Plastic Deformation of Single Crystals of Tin. K. A. Jackson and B. Chalmers. *Canadian Journal of*

Physics, v. 31, Sept. 1953, p. 1017-1018.

Effect of existing substructure on a substructure subsequently formed by deformation. Micrograph, macrograph. 3 ref. (Q24, Sn)

877-Q. Strength of Copper at Elevated Temperatures. H. L. Burghoff. *Electrical Manufacturing,* v. 52, Sept. 1953, p. 143-145.

Results obtained from a 10-year laboratory investigation of tensile creep properties of nine types of Cu and Cu alloys. Tables, photographs. (Q3, Q23, Cu)

878-Q. Brittle Fracture Studies in the United States. S. L. Hoyt. *Engineering,* v. 176, Aug. 14, 1953, p. 220-221.

Fracture, "match point" and manufacturing variables. (Concluded.) (Q26)

879-Q. Some Aspects of the Tensile Test. E. Siebel and P. Melchior. *Engineers Digest,* v. 14, Aug. 1953, p. 297-300.

Translated and condensed from *Industrie Anzeiger,* v. 75, no. 39, May 15, 1953, p. 4-9 and no. 35, May 1953, p. 3-5. Influence of speed of straining rigidity of the testing machine, nonaxial loading, and shape and surface of the test specimen. How rigidity of the testing machine can be measured and how it influences the autographic record of the machine. Graphs. 6 ref. (Q23)

880-Q. Plastic Stress-Strain Relations Under Radial and Non-Radial Combined Stress Loading. Joseph Marin and John A. Sauer. *Franklin Institute, Journal,* v. 256, Aug. 1953, p. 119-128.

Results for various types of loading, including tests where constant stress ratios were maintained and tests involving variable stress ratios. Graphs. 4 ref. (Q27, Al)

881-Q. The Mechanism of Residual-Stress Formation in Sand Castings. R. N. Parkins and A. Cowan. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 1-8.

Experimental results show that residual stresses in sand castings result from three factors whose magnitude of contribution varies with type casting produced. Special attention given to temperature differences in casting. Diagrams, tables, graphs. 16 ref. (Q25, E11, CI, Cu, Al)

882-Q. Structural Studies of the Creep of Lead. R. C. Gifkins. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 39-47.

Occurrence of slip traces, grain boundary migration, strain marks from triple points, inhomogeneous strain within grains, tilting and bodily rotation of grains, relative movement of grains, and examination of specimens after large creep extensions. 42 ref. (Q3, Pb)

883-Q. Directionality Affects Physical Properties of Wrought Metals. H. A. Unckel. *Iron Age,* v. 172, Sept. 10, 1953, p. 170-173.

Causes of anisotropy and its effects on strength, and ductility. Tables. 14 ref. (Q23)

884-Q. Airframe Design. P. L. Teed. *Iron & Steel,* v. 26, Sept. 1953, p. 421-426.

Physical and mechanical properties of various metals and their effects on design. Graph, tables. 4 ref. (Q general, P general, T24)

885-Q. Causes and Prevention of Premature Gear Failures. Rankin Johnson, Jr. and S. D. Craine. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 118-128; disc., p. 128-136.

Tooth surface irregularities, abrasives in the oil, mechanical damage, metal or lubricant failure, misalignment and thrust. Photographs, diagram, tables. (Q general, R general, T7)

886-Q. Bending Tests of Thin-Walled Sandwich Cylinders. George Gerard. *Journal of the Aeronautical Sciences,* v. 20, Sept. 1953, p. 639-641.

Series of bending tests. Design using Al alloy faces and either cellular cellulose acetate or end grain balsa cores. Tables, photograph. 3 ref. (Q5, Al)

887-Q. Determination of the Surface Stress by Means of Electroplating. H. Okubo. *Journal of Applied Physics,* v. 24, Sept. 1953, p. 1130-1133.

Method using Cu-plated test pieces and observing flecks on the surface produced by cyclic stress. Diagrams, tables, graph. (Q25)

888-Q. Some Low Temperature Properties of Titanium Alloy RC-130-B and Stainless Steel. W. W. Tyler, L. B. Nesbitt, and A. C. Wilson, Jr. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1104-1105.

Investigation of thermal conductivity and impact strength of Ti alloy, RC-130-B and 316 stainless steel. Graphs. (Q6, P11, Ti, SS)

889-Q. Creep Behavior of Extruded Electrolytic Magnesium. C. S. Roberts. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1121-1126.

Creep mechanism and kinetics of fine-grained Mg were studied from 200 to 600° F. As a result of a photographic study of microstructural changes, transient and steady-state creep components were correlated with slip, subgrain formation, and cyclic deformation at the grain boundaries. Graphs, micrographs. 30 ref. (Q3, Q24, Mg)

890-Q. Plasticity of Columbium Single Crystals. R. Maddin and N. K. Chen. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1131-1136.

Cb single crystals were deformed in tension and compression. Diagrams, micrographs. (Q23, Cb)

891-Q. Effect of Grain Size Upon Temper Brittleness. L. D. Jaffe, F. L. Carr, and D. C. Buffum. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1147-1148.

Investigation using SAE 3140 steel. Graphs. (Q23, AY)

892-Q. A Rationalization of Measured High Temperature Properties of Fe-Cr-Co-Ni Alloys. J. D. Nisbet and W. R. Hibbard, Jr. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1149-1165.

High-temperature properties of Fe-Cr-Co-Ni-base alloys and effects of hardening element additions on those properties discussed on basis of general principles of alloying. Graphs, diagrams, table, micrographs. 29 ref.
(Q general, Fe, Cr, Co, Ni)

893-Q. Inhomogeneity in Creep Deformation of Coarse Grained High Purity Aluminum. H. C. Chang and N. J. Grant. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1175-1180.

Creep of very coarse grained high-purity Al was studied at 400, 700, and 1100° F. at initial stresses of 50 to 1200 psi. Local strain measurements were made across the grain boundaries and in different regions of various grains during creep. Significance of creep curve equations and activation energies. Diagrams, graphs, micrographs.
(Q3, Al)

894-Q. Plastic Stress-Strain Relations for Aluminum Alloy 14S-T6 Subjected to Combined Tension and Torsion. Joseph Marin and H. A. B. Wiseman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1181-1190.

Experimental study. Plastic stress-strain relations for both constant and various types of variable stress ratios were determined. Comparison made with the simple flow theory of plasticity. Graphs. (Q23, Al)

895-Q. Deformation Mechanisms in Alpha Titanium. E. A. Anderson, D. C. Jillson, and S. R. Dunbar. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1191-1197.

Study of pure Ti at room temperatures. Tables, diagrams, micrographs. (Q24, Ti)

896-Q. Effects of Solid Solution Alloying on the Cold-Rolled Texture of Titanium. Carl J. McHargue, Sam E. Adair, Jr., and Joseph P. Hammond. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1199-1203.

Cold-rolled sheet textures were determined for binary solid solutions of Al, Cb, Ta, and Zr in Ti. Diagrams. (Q24, M24, Ti)

897-Q. Plastic Deformation of Rectangular Zinc Monocrystals. John J. Gilman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1217-1222.

Data which indicate that critical shear stress and strain-hardening rate of a Zn monocrystal depend on the orientation of its slip direction with respect to its external boundaries. Diagrams, tables. 13 ref.
(Q24, Zn)

898-Q. Variation of Plastic Properties With Annealing Procedure in Zinc Single Crystals. Choh Hsien Li, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1223-1225.

Yield stress in Zn single crystals is dependent on prior annealing temperature and rate of cooling after annealing. Tentative mechanism for the effect. Graphs.
(Q23, J23, Zn)

899-Q. Relation Between Initial Creep Rate and Resolved Shear Stress in Zinc Single Crystals. N. Brown, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining*

and Metallurgical Engineers, Transactions, v. 197, 1953, p. 1229-1230.

Investigation to establish some reproducible relation between initial creep rate and resolved shear stress at higher stress levels where the total creep strain is not limited. (Q3, Q2, Zn)

900-Q. Plastic Deformation of Single Crystals of Copper. J. J. Becker and J. N. Hobstetter. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1231-1234.

Microscopic features of the plastic deformation of Cu single crystals. Micrographs. (Q23, Cu)

901-Q. Plastic Deformation of Iron Between 300° and 77.2° K. Donald F. Gibbons. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1245-1250.

Study of tensile deformation on two samples. Graphs, micrographs. 19 ref. (Q24, Fe)

902-Q. Efficient Structures in Aluminium. M. Bridgewater. *Machinery Lloyd (Overseas Ed.)* v. 25, Aug. 29, 1953, p. 81, 83-85.

Properties of Al in respect to structural uses. Diagrams, photographs. (Q general, Al)

903-Q. Boron in Steel. *Machinery Lloyd (Overseas Ed.),* v. 25, Aug. 29, 1953, p. 87, 89-92.

Effect of B on hardenability, brittleness, creep resistance, and welding properties of high speed steel and special alloys. Graphs. (Q23, Q3, J26, K general, ST)

904-Q. New Creep Resistant Ferritic Steels. David D. Howat. *Materials & Methods,* v. 38, Sept. 1953, p. 87-90.

Advantages and disadvantages. Development of ferritic steels for gas turbines. Tables, graphs. 9 ref. (Q3, T25, AY)

905-Q. Selecting Materials to Meet Mechanical Design Requirements. J. R. Hunt. *Materials & Methods,* v. 38, Sept. 1953, p. 102-107.

Yield strength, elastic modulus, density, and price of various materials. Tables. (Q23, Q21, P10, ST, Al, Mg, Cu, Ni, Ti)

906-Q. Modern Cast Irons. A Digest of Data on Currently Used Materials. K. J. A. Brookes and R. H. Warring. *Mechanical World and Engineering Record,* v. 133, Sept. 1953, p. 398-401.

Typical specifications and properties. Tables, diagrams. (Q general, S22, CI)

907-Q. Endurance of Helical Springs Related to Properties of the Wire. H. C. Burnett and C. L. Staugaitis. *Metal Progress,* v. 64, Sept. 1953, p. 77-81.

Methods of fatigue testing spring wire and completed springs. Photographs, table, graphs. (Q7)

908-Q. Properties and Structure of Titanium After 30-Min. Heating at 1200 to 2000° F. E. Walden and L. A. Dixon. *Metal Progress,* v. 64, Aug. 1953, p. 88-89.

Tensile strength and elongation properties. Tables, micrographs. (Q23, Ti)

909-Q. High-Temperature Strength of Aluminum-Magnesium Alloys. I. I. Kornilov and L. I. Pryakhina. *Metal Progress,* v. 64, Aug. 1953, p. 140-143.

Digest of "Effect of Temperature on the High-Temperature Strength of Alloys in the Aluminum-Magnesium System", *Doklady Akademii Nauk SSSR,* v. 87, 1952, p. 971-974. Creep at temperatures up to 750° F. (Q3, Al, Mg)

910-Q. Sigma Phase in Heat Resisting Steels. J. I. Morley and H. W. Kirby, *Metal Progress,* v. 64, Sept. 1953, p. 140-142, 144.

Condensed from "Sigma-Phase Embrittlement in 25 Cr-20 Ni Heat Resisting Steels", *Iron and Steel Institute, Journal,* v. 172, Oct. 1952, p. 129-142. Influence of prior heat treatment, annealing temperature, exposure times, grain size, reduction by cold work, and varying amount of C, Cr, Ni, N_2, Si, Nb and Ti. (Q23, M26, AY)

911-Q. Compression Properties of Aluminium Alloys. D. A. Barlow and A. W. Brace. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 399-404.

Rivet driving characteristics agreed with compression test results. Tensile data gave little indication of compressive ductility. Tables, photographs, diagram. (Q28, K13, Al)

912-Q. Some Remarks Regarding Wear on the Flanks of Carbide Cutting Tools. L. H. Hovenkamp and E. Van Emden. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 116-119; disc., p. 120-121.

Cause of abnormal wear. Diagrams, micrographs. (Q9, G18, C-n)

913-Q. Contribution to the Study of the Resistance to Wear of Cutting Tools. M. F. Eugéne. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 122-126.

Translated from the French. Investigation of wear distribution on cutting tools. Diagrams, micrographs. (Q9, G18, SG-j)

914-Q. Original Method of Measuring the Intrinsic Resistance to Wear of Cutting Tools. M. F. Eugéne. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 127-131; disc., p. 131.

Translated from the French. Method which is relatively independent of material machined and machining variables. (Q9, G17, SG-j)

915-Q. Behavior of Materials Under Conditions of Thermal Stress. S. S. Manson. *National Advisory Committee for Aeronautics,* Technical Note no. 2933, July 1953, 105 p.

Reviews available information on the behavior of brittle and ductile materials. (Q23)

916-Q. Calibration of Strain-Gage Installations in Aircraft Structures for the Measurement of Flight Loads. T. H. Skopinski, William S. Aiken, Jr., and Wilber B. Huston. *National Advisory Committee for Aeronautics,* Technical Note no. 2993, Aug. 1953, 70 p.

General method for calibrating strain-gage installations in aircraft structures. Permits measurement in flight of the shear or lift, bending moment, and torque or pitching moment on the principal lifting or control surfaces. Tables, diagrams, graphs. (Q25)

917-Q. The Release of the Energy Stored in Deformed Nickel. L. M. Clarebrough, M. E. Hargreaves and G. W. West. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 913-915.

Measurements of energy stored during deformation were made on Ni and correlated with measurement of hardness and electrical resistivity. 10 ref. (Q24, Q29, P15, Ni)

918-Q. Effect of Plastic Deformation on Subsequent Decomposition in Aluminum Alloys Al-Si and Al-Mg-Si. N. N. Buinov and V. P. Savinykh. *National Science Foundation Translation,* no. NSF-tr-9, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 257.

Precipitation, block structure and alterations in submicroscopic structure caused by deformation. Micrographs. 4 ref. (Q24, Al)

919-Q. Resistance to Abrasive Wear and the Hardness of Metals. M. M. Khrushchov and M. A. Babichev. *National Science Foundation Translation,* no. NSF-tr-15, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 445.

Relative resistance to wear is directly proportional to hardness. Graphs, tables. (Q9, Q29, Fe, CN)

920-Q. An Estimate of Displacements and Deformations of Underground Gas Conduits Due to Temperature. K. S. Zarembo. *National Science Foundation Translation,* no. NSF-tr-18, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 53.

Stresses in pipe lines caused by pressure and temperature of gas and of soil surrounding the pipe. Table, graphs. 4 ref. (Q25, ST)

921-Q. On a "New" Mechanism of Plasticity of Metallic Solid Solutions. K. A. Osipov, S. G. Fedotov, and M. G. Lozinsky. *National Science Foundation Translation,* no. NSF-tr-19, June 1953, 5 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 57.

Experimental data confirming the possibility that a nonslip mechanism of plasticity takes place in a solid solution of Cu and Pb. Graph, micrographs. 16 ref. (Q23, Cu, Pb)

922-Q. Interaction Between Crystal Slip and Grain Boundary Movement. D. McLean. *Nature,* v. 172, Aug. 15, 1953, p. 300-301.

Creep mechanism using data from Al specimens. (Q3, M27, Al)

923-Q. Score Resistance of Bearing Metals. Arvid E. Roach, Carl L. Goodzeit, and Paul A. Totta. *Nature,* v. 172, Aug. 1953, p. 301.

Effects of solid solution formation on bearing properties. (Q9, SG-m)

924-Q. Titanium at Work. Carl E. Hartbower. *Ordnance,* v. 38, Sept.-Oct. 1953, p. 345-347.

Properties of Ti and uses in military equipment. Tables, photographs. (Q general, T2, Ti)

925-Q. A Note on the Portevin-Le Chatelier Effect. A. H. Cottrell. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 829-832.

In Al, if concentration of vacancies is increased by plastic deformation or quenching, the rate of diffusion may increase sufficiently to cause strain aging during plastic deformation. A serrated stress-strain curve should result. This is used to explain the Portevin-Le Chatelier effect. 18 ref. (Q24, J26, Al)

926-Q. The Growth of Fatigue Cracks. A. K. Head. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 925-938.

Qualitative features. Graphs, diagrams. 9 ref. (Q7)

927-Q. Slip Lines and Etchpits. S. Amelinckx. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 1048-1049.

Study of distribution of dislocations along slip lines in Al. 10 ref. (Q24, Al)

928-Q. The Variation of the Elastic Constants of Crystalline Aluminum

With Temperature Between 63° K. and 773° K. Paul M. Sutton. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 816-821.

Measurement of adiabatic elastic moduli of crystalline Al using composite piezoelectric oscillator. Diagram, tables, 30 ref. (Q21, Al)

929-Q. Deformation of Copper Single Crystals at 300° K. and 78° K. T. H. Blewitt. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1115-1121.

Data showing effect of deformation on electrical resistivity and other properties. Tables, graphs, diagrams. 28 ref. (Q24, P15, Cu)

930-Q. Fatigue. H. L. Cox. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 559-565; disc., p. 589-593.

Theory and causes of fatigue in metals. Graphs, photographs. (Q7)

931-Q. Fatigue From the Metallurgist's Viewpoint. E. R. Gadd. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 565-580; disc., p. 589-593.

Structural discontinuities and grain flow; effect of nitriding, cyaniding, carburizing, decarburization, surface hardening, cold work and surface coatings; and influence of temperature and environment. Tables. 78 ref. (Q7)

932-Q. Fatigue in Engine Design. F. M. Owner. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 580-584; disc., p. 589-593.

Design aspects of fatigue, assessment of conditions of loading, effect of damping, diversity of parameters, fatigue life and design maxims. (Q7)

933-Q. Fatigue in Aircraft Design. B. E. Stephenson. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 584-588; disc., p. 589-593.

Causes of fatigue and possible remedial actions. Diagrams, graphs. (Q7)

934-Q. Proposed New Scales for Expressing the Stiffness of Round and Flattened Wire. J. M. Thomas and L. Thomassen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 875-876, 924.

Method of combining cross section, torque applied, and degree of bend into a single term. Photographs, tables. (Q23, ST)

935-Q. Investigation of Stress Waves in Cylindrical Steel Bars by Means of Wire Strain Gauges. S. Petersson. *Acta Polytechnica (Mechanical Engineering Series),* v. 2, no. 7, 1953, 21 p.

Techniques. Effects of damping and stress frequency studied by oscillograph. Diagrams. 7 ref. (Q25, ST)

936-Q. (English.) **Some Effects of Minor Elements on the Characteristics of Plain Carbon Steels.** Francis W. Boulger. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.75, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Effects of S, P, and N on the properties of low and medium C steels. Table. 40 ref. (Q general, CN)

937-Q. (Dutch.) **Progress in the Investigation of Mechanical Properties.** A. J. Staverman. *T.N.O.-Nieuws,* v. 8, no. 86, June 1953, p. 195-200.

Various nondestructive tests based upon the principle that mechanical properties are the result of the chemical and physical structure of the material. Photographs. (Q general, S general)

938-Q. (French.) **Statistical Study of the Elastic Transition as a Function of Temperature in Soft and Extra Soft Steels.** Jeanine Ulmo, Francois Bastenaire, and René Borione. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 59-62.

Statistical methods to determine the temperature zone in which the passage from elastic to brittle state occurs. Diagrams. (Q23, ST)

939-Q. (French.) **Influence of Primary Structure on the Modulus of Elasticity of Gray Pig Iron.** Elisabeth Plenard. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 260-262.

A study on the relation of graphitic lamina length to structure of the matrix. Graphs, table. 3 ref. (Q21, CI)

940-Q. (French.) **Structural Changes of Aluminum and Its Alloys During Flow. I.** G. Wyon. *Metaux, Corrosion-Industries,* v. 28, no. 333, May 1953, p. 203-221.

Experimental results and their interpretation. Microphotographs. (To be continued.) (Q24, Al)

941-Q. (French.) **Structural Changes of Aluminum and Its Alloys During Flow. II.** G. Wyon. *Metaux, Corrosion-Industries,* v. 28, no. 334, June 1953, p. 244-261.

Channelized creep. Presence of 0.1% Zr increased resistance to extrusion. Photomicrographs, diagrams. 20 ref. (Q24, Q3, Al)

942-Q. (French.) **Fracture Strength of Steel Using U-Shaped Specimens and Tensile Testing at a Slow Rate.** Wilhelm Ruttmann, Gerhard Bandel, and Rudolf Schinn. *Metaux, Corrosion-Industries,* v. 28, no. 334, June 1953, p. 262-274.

Tests for heat resistant steels using various temperatures and

stress conditions. Tables, photographs. 9 ref. (Q26, Q27, ST)

943-Q. (German.) **Behavior of Metallic Substances, Especially of Steels, at Low Temperatures.** S. Henkel. *Chemische Technik,* v. 5, no. 6, June 1953, p. 322-325.

Mechanical properties of steels, Al, and Al alloys were determined down to −180° C. Tables, graphs. 14 ref. (Q general, ST, Al)

944-Q. (German.) **Determining "True" Limit of Elasticity by Alternating Tension Testing.** E. Mohr. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 19, Ausgabe B, no. 2, 1953, p. 33-43.

Method purported to be cheaper, more accurate and more sensitive to influence of notching. Graphs, table. 19 ref. (Q21, Q27, Al, Mg, Fe)

945-Q. (German.) **Tests of Single-Row Light-Metal Riveted Joints.** K. Wellinger and H. Uetz. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 586-592.

Tensile and shear testing of various Al alloys. Photographs, graphs, diagrams, tables. 4 ref. (Q27, Q2, K13, Al)

946-Q. (German.) **Regression of Cold-Tempering in Al-Zn-Mg Alloys.** W. Rosenkranz. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 598-602.

Tests showing that hardness properties are stable only up to temperatures of 60 to 70° C. Decrease of hardness is proportional to the temperature increase. Graphs, tables. 2 ref. (Q29, Al)

947-Q. (German.) **Properties of Rimmed Low-Carbon Basic Bessemer Steel After Water Hardening From Rolling Temperature.** Walther Dick. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 945-966.

Aging resistance, stress values, brittle fracture, influence of brief local heat effects and notched-bar impact bending. Graphs, tables, photographs. 14 ref. (Q general, J26, ST)

948-Q. (Hungarian.) **Investigation of the Friction Properties of Bearing Metals.** Jozsef Czégi. *Aluminium (Budapest),* v. 5, no. 2, Feb. 1953, p. 31-45.

Extensive investigation by the Hungarian Bronze Committee on Al, bronze and Fe bearings. Results evaluated theoretically and practically. Tables, graphs. 19 ref. (Q9, Al, Cu, Fe)

949-Q. (Hungarian.) **Effect of Microstructure on the Plasticity of Unalloyed Steels. I.** Odön Szabo. *Kohaszati Lapok,* v. 8, no. 2, Feb. 1953, p. 47-48.

Processes taking place during shear tests and relationships between change in form and hardening by means of a true stress-compression diagram. Graphs. (Q23, CN)

950-Q. (Italian.) **New Orientations in the Study of the Mechanical Properties of Solids.** F. Gatto. *Alluminio,* v. 22, no. 2, 1953, p. 137-147.

New parameters and examples of their applications. Graphs. 33 ref. (Q general, Al, Mg, Zn)

951-Q. (Italian.) **Impact Test of Light Alloys.** F. Gatto. *Alluminio,* v. 22, no. 3, Mar. 1953, p. 271-286.

Influence of specimen shape, test speed, and temperature. Tables, graphs, photographs, micrographs. 34 ref. (Q6, Al)

952-Q. (Portuguese.) **Practical and Metallurgical Aspects of Martensitic White Cast Iron With Reference to Its Application Against Abrasion.** Kenneth A. DeLonge and Horace A. Hunnicutt. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 21-46.

Advantages of martensitic structure in abrasion resistance and practical application of these advantages. Various production methods. Tables. (Q9, CI)

953-Q. (Russian.) **Deformations and Stresses of a Steel Sheet by Localized Heating.** O. A. Bakshi. *Avtogennoe Delo,* v. 24, no. 2, Feb. 1953, p. 1-6.

Problem of elastic-plastic equilibrium in thin disks. Solution permits determination of stresses and deformations in thin sheets. Diagrams, graphs. 7 ref. (Q21, Q23, Q25, ST)

954-Q. (Swedish.) **Influence of Primary Creep on Stresses in Structural Parts.** Folke K. G. Odqvist. *Kungl. Teknishka Högskolans Handlingar (Transactions of the Royal Institute of Technology,* Stockholm, Sweden), no. 66, 1953, 16 p.

How primary creep may be considered within a purely phenomenological theory and how it is possible to extend it to general 3-dimensional stress systems. Graphs, diagrams. (Q3)

955-Q. A New High Range Strain Gage. James A. Hurry and Richard P. Woolley. *Rubber Age,* v. 73, Sept. 1953, p. 799-800.

Hg-filled "wire" which gave reliable results at up to 50% strain for over 2000 cycles. Photographs, graph. (Q25)

956-Q. (Book.) **Behavior of Metals at Low Temperatures.** R. M. Brick, J. R. Low, Jr., and C. H. Lorig. 113 p.

American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $3.00.

Three lectures presented at the National Metal Congress in October 1952. The first deals with the behavior of single crystals and of pure metals; the second with influence of mechanical variables; and the third, with influence of metallurgical factors. (Q general)

957-Q. (Book.) **Strain Gauges. Theory and Application.** J. J. Koch, R. G. Boiten, A. L. Biermasz, G. P. Roszbach, and G. W. Van Santen, 95 pages. 1952. Philips Library, Eindhoven, Netherlands. American distributor, Elsevier Press, 402 Lovett Blvd., Houston 6, Texas. $2.75.

Construction and properties of strain gages; measuring instruments; technique of cementing and connecting strain gages; evaluation and interpretation of values measured; stresses and theories of failure; and application of strain gages in measuring instruments. (Q25)

958-Q. (Book—German.) **(Elasticity and Strength in Pipe Construction.) Elastizität und Festigkeit im Rohrleitungsbau.** Helmut von Jürgensonn. Rev. ed. 2. 400 p. 1953. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 40 DM.

Strength calculations of pipes; general principles; raw materials and their properties; effect of pressure and temperature on the pipe wall; thermal expansion and its equilibrium; and elastic calculations of pipe lines. (Q general)

959-Q. Determination of Strains Between Enamel and Iron by Means of Split Rings. J. D. Walton, Jr. and B. J. Sweo. *American Ceramic Society, Journal,* v. 36, Oct. 1953, p. 335-341.

Apparatus used and method of determining strains. Graphs, diagrams, photographs, table. (Q25, L27)

960-Q. Correlation Between Heat Treatment, Microstructure and Mechanical Properties of Titanium-Molybdenum Alloys. D. J. DeLazaro and W. Rostoker. *American Society for Metals, Preprint* no. 8, 1953, 18 p.

Tensile and impact properties obtained for a wide range of time and temperature combinations of isothermal transformation. Tables, graphs, micrographs. (Q23, N8, J general, Ti, Mo)

961-Q. Transverse Mechanical Properties of Slack-Quenched and Tempered Wrought Steel. John Vajda and Paul E. Busby. *American Society for Metals, Preprint* no. 9, 1953, 25 p.

Method for developing reproducible slack-quenched structures in heavy steel sections. Tables, graphs, micrographs. 12 ref. (Q general, J26, ST)

962-Q. The Effect of Inclusions on the Fatigue Strength of SAE 4340 Steels. J. T. Ransom. *American Society for Metals, Preprint* no. 12, 1953, 10 p.

Nonmetallic inclusions as a source of fatigue weakness in forged machine elements. Tables, micrographs. (Q7, AY)

963-Q. Observations on the Behavior of Hydrogen in Zirconium. C. M. Schwartz and M. W. Mallett. *American Society for Metals, Preprint* no. 14, 1953, 13 p.

Embrittling effects of H in Zr. Tables, graphs, micrographs. 6 ref. (Q23, N15, Zr)

964-Q. Recrystallization Applied to Control of the Mechanical Properties of Molybdenum. J. H. Bechtold. *American Society for Metals, Preprint* no. 15, 1953, 17 p.

Mechanical properties of Mo related to microstructure developed by prior mechanical and thermal history. Tables, graphs, micrographs. 7 ref. (Q general, N5, M27, Mo)

965-Q. The Effect of Pearlite Spacing on Transition Temperature of Steel at Four Carbon Levels. John A. Rinebolt. *American Society for Metals, Preprint* no. 18, 1953, 11 p.

Ductile-brittle transition shown by impact, tensile and hardness properties. Tables, graphs, micrographs. 7 ref. (Q6, Q23, Q29, CN)

966-Q. The Effect of Boron on Notch Toughness and Temper Embrittlement. A. E. Powers and R. G. Carlson. *American Society for Metals, Preprint* no. 21, 1953, 11 p.

Isothermal embrittlement curves constructed for two Mn steels having identical base composition but differing in B content. Tables, graphs, micrographs. 6 ref. (Q23, AY)

967-Q. Effect of Chemical Composition on Susceptibility of Steels to Temper Brittleness. Ralph Hultgren and John Chuan Chang. *American Society for Metals, Preprint* no. 26, 1953, 14 p.

Studies on high-purity alloys prepared by melting together the constituent elements under He. Tables, graphs. 9 ref. (Q23, AY)

968-Q. The Embrittlement of Alloy Steel at High Strength Levels. L. J. Klingler, W. J. Barnett, R. P. Frohmberg, and A. R. Troiano. *American Society for Metals, Preprint* no. 27, 1953, 33 p.

Three methods of minimizing embrittlement occurring during tem-

pering of quenched steels. Tables, graphs. 41 ref. (Q23, J29, AY)

969-Q. Flow and Fracture of Single Crystals of High Purity Ferrite. R. P. Steijn and R. M. Brick. *American Society for Metals, Preprint* no. 36, 1953, 37 p.

Flow and fracture studies on single crystals of two high-purity Ti ferrites and one high-purity Fe-C alloy. Tables, graphs, diagrams. 16 ref. (Q24, Q26, Fe)

970-Q. Notch-Bar Tensile Properties of Various Materials and Their Relation to the Unnotch Flow Curve and Notch Sharpness. Harry Schwartzbart and W. F. Brown, Jr. *American Society for Metals, Preprint* no. 37, 1953, 24 p.

Effects of strain hardening characteristics and notch sharpness on notch tensile properties. Table, diagram, graphs. 11 ref. (Q23, Cu, Ti)

971-Q. Effect of Some Solid Solution Alloying Elements on the Creep Parameters of Nickel. Thomas H. Hazlett and Earl R. Parker. *American Society for Metals, Preprint* no. 38, 1953, 15 p.

Constant-stress creep studies on four series of solid solution Ni alloys. Graphs, tables. 6 ref. (Q3, Ni)

972-Q. Effect of Grain Size and Carbon Content on the Low Temperature Tensile Properties of High Purity Fe-C Alloys. R. L. Smith, G. Spangler, and R. M. Brick. *American Society for Metals, Preprint* no. 3W, 1953, 25 p.

Several low-C ferrites were prepared and tested in tension under various conditions of heat treatment, ferrite grain size, and test temperature. Graphs, tables, micrographs. 30 ref. (Q23, Fe)

973-Q. The Substitution of Manganese for Nickel in 16-25-6 Alloy. Wells E. Ellis and Martin Fleischmann. *American Society for Metals, Preprint* no. 11W, 1953, 15 p.

Mechanical properties, precipitation hardening data and microstructural characteristics of a modified Timken 16-25-6 alloy. Tables, graphs, micrographs. (Q general, J27, M27, AY)

974-Q. Work Softening of 16-25-6 Alloy at Elevated Temperatures. Douglas A. J. Millar and John Wulff. *American Society for Metals, Preprint* no. 12W, 1953, 10 p.

True stress-true strain curves for Timken alloy 16-25-6. Graphs, micrographs. 17 ref. (Q27, AY)

975-Q. Effect of Grain Size on High Temperature Fatigue Properties. J. E. Breen and J. R. Lane. *American Society for Metals, Preprint* no. 13W, 16 p.

Tensile-fatigue and stress rupture tests on alpha brass between 550 and 1000° F. and at room temperature. Tables, graphs, micrographs. 8 ref. (Q7, Cu)

976-Q. Mechanical Anisotropy in Copper. W. A. Backofen, A. J. Shaler and B. B. Hundy. *American Society for Metals, Preprint* no. 14W, 1953, 21 p.

A fibrous structure of flaws having characteristics of cracks was found in Cu specimens varying in purity and processing history. Tables, graphs, macrographs. 22 ref. (Q24, Cu)

977-Q. Effect of Prestrain Histories on the Creep and Tensile Properties of Aluminum. Oleg D. Sherby, Alfred Goldberg, and John E. Dorn. *American Society for Metals, Preprint* no. 15W, 1953, 20 p.

Data correlated with various substructures developed during creep testing of annealed and cold worked pure Al. Tables, graphs, micrographs. 10 ref. (Q3, Q23, Al)

978-Q. Effect of Dispersions of $CuAl_2$ on the Elevated Temperature Tensile Properties of Aluminum-Copper Alloys. C. D. Starr, R. B. Shaw, and J. E. Dorn. *American Society for Metals, Preprint* no. 16W, 1953, 13 p.

Tensile properties of 3, 4 and 5% Cu-Al alloys were investigated from 295 to 700° K. Tables, graphs, micrographs. 5 ref. (Q23, Al, Cu)

979-Q. The Fatigue Properties of Nodular Cast Iron. K. B. Palmer and G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Aug. 1953, p. 2-14.

Tests on as-cast pearlitic and heat treated ferritic irons. Effect of Si addition. Tables, graphs, micrographs, diagrams, photographs. (Q7, Si, CI)

980-Q. Some Effects of Microstructure Upon Temper Brittleness. D. C. Buffum and L. D. Jaffe. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1373-1374.

Tempered martensite was found to be more subject to temper brittleness than pearlite or ferrite. Graphs. 11 ref. (Q23, M27, AY)

981-Q. Design Properties of Materials. I. Robert L. Stedfeld. *Machine Design*, v. 25, Oct. 1953, p. 138-148.

How properties data can be used more effectively for materials evaluation and selection. Photographs. (Q general, P general)

982-Q. Critical Design Factors for High-Strength Steel. N. J. Wells and

M. V. Ward. *Machine Design,* v. 25, Oct. 1953, p. 149-157.

How use of standard materials at increased strength levels offers practical approach to problems of weight and space conservation encountered today. Photographs, tables, graphs. (Q23, ST)

983-Q. Materials Engineering File Facts. *Materials & Methods,* v. 38, Oct. 1953, p. 153, 155, 157.

Tabulates mechanical and physical properties of carbon and low-alloy steel castings.
(Q general, P general, CI)

984-Q. Edge Dislocations in Inhomogeneous Media. A. K. Head. *Physical Society, Proceedings,* v. 66, no. 405B, Sept. 1953, p. 793-801.

Method to reduce problems of elastic plane strain in a bimetallic medium to standard problems of potential theory. Diagram. 5 ref. (Q21, M26)

985-Q. Ultra High Strength Steel for Aircraft Structures. M. A. Melcon. *Product Engineering,* v. 24, Oct. 1953, p. 129-141.

Static, impact and fatigue properties; notch sensitivity, fabrication, and processing. Graphs, tables. 13 ref. (Q6, Q7, Q23, T24, CN)

986-Q. Yield Points in Brass Crystals. G. W. Ardley and A. H. Cottrell. *Royal Society, Proceedings,* v. 219, ser. A, Sept. 22, 1953, p. 328-341.

Study on single crystals of brass grown in A or N_2. Diagrams, graphs, micrographs. 36 ref. (Q23, Cu)

987-Q. Charts Relating the Compressive Buckling Stress of Longitudinally Supported Plates to the Effective Deflectional and Rotational Stiffness of the Supports. Roger A. Anderson and Joseph W. Semonian. *U. S. National Advisory Committee for Aeronautics, Technical Note* 2987, Aug. 1953, 53 p.

Stability of a plate under edge compressive stress analyzed. Deflectional and rotational restraint provided by longitudinal stiffness and full-depth webs discussed. Diagrams, graphs, tables. 11 ref. (Q28)

988-Q. Column Strength of H-Sections and Square Tubes in Postbuckling Range of Component Plates. P. P. Bijlaard and G. P. Fisher. *U. S. National Advisory Committee for Aeronautics, Technical Note* 2994, Aug. 1953, 106 p.

Column buckling stress in the range where component plates have buckled was calculated by method of split rigidities. Graphs, diagrams, photographs. 19 ref. (Q28)

989-Q. Coefficient of Friction and Damage to Contact Area During the Early Stages of Fretting. I. Glass, Copper, or Steel Against Copper Douglas Godfrey and John M. Bailey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3011, Sept. 1953, 23 p.

Graphs, tables, diagrams, photograph, micrograph. 6 ref. (Q9, Cu, ST)

990-Q. Arc Welding of Low Chromium-Molybdenum Steel Pipe. Jay Bland. *Welding Journal,* v. 32, Sept. 1953, p. 803-814.

Correlation between hardness and ductility and between hardness and tensile strength in pipe and weld deposits. Photographs, graphs, tables. 7 ref. (Q29, Q23, K1, AY)

991-Q. Load-Carrying Capacity of Fillet Weld Connections. F. Koenigsberger and H. W. Green. *Welding Journal,* v. 32, Sept. 1953, p. 859-863.

Static and fatigue loading. Diagrams, graphs, photographs, tables. (Q27, Q7, K1, ST)

992-Q. Heat-Treatment Effects on Transition Temperature of a Ship Steel. E. B. Evans and L. J. Klingler. *Welding Journal,* v. 32, Sept. 1953, p. 417s-431s.

Investigation on various subcritical heat treatments on ductility of a 1025 semikilled steel. Tables, diagrams, graphs, micrographs. 9 ref. (Q23, J general, CN)

993-Q. Fatigue Properties of Weld Metal. L. A. Harris, R. B. Matthiesen, and N. M. Newmark. *Welding Journal,* v. 32, Sept. 1953, p. 441s-453s.

Properties of specimens deposited with E7016 low-hydrogen electrodes and with E6010 high-hydrogen electrodes. Tables, macrographs, micrographs, graphs, diagrams. 11 ref. (Q7, ST)

994-Q. Scale Effect in Notch Brittleness. Yoshio Akita. *Welding Journal,* v. 32, Sept. 1953, p. 475s-480s.

Tests on mild steel specimens of geometrically similar shape. Tables, graphs. (Q23, CN)

995-Q. (Dutch.) **A Comparative Investigation on the Fatigue Strength at Fluctuating Tension of Several Types of Riveted Lap Joints, a Series of Bolted and Some Series of Glued Lap Joints of 24 ST Alclad.** A. Hartman and C. C. Duyn. *National Luchtvaartlaboratorium,* Amsterdam, Report M. 1357, 26 p.

Tables. 4 ref. (Q7, A1)

996-Q. (French.) **Precautions Taken During Fatigue Testing of Assemblies and Structures.** H. de Leiris. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 7, July 1953, p. 203-211.

Suggests greater care in initial stages of test. Graphs, diagrams, micrographs. 9 ref. (Q7)

997-Q. (German.) **Behavior of Steels of Varying Notch-Impact Strength During Deformation by Multiaxial Loading.** Richard Mailänder, Hubert Bennek, and Eduard Houdremont. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 7-8, July-Aug. 1953, p. 315-321.

Differences of steels in tendency toward brittle fracture. Photographs, graphs, tables. 7 ref. (Q23, Q6, ST)

998-Q. (German.) **Origin of Slip Lines on Plastically Deformed Metallic Surfaces.** Wilhelm Spath. *Metalloberfläche,* Ausgabe A, v. 7, no. 8, Aug. 1953, p. 119-121.

Shows that ultrasonic waves are originated during slip of plastically deformed metals. Diagram. 9 ref. (Q24)

999-Q. (German.) **Friction and Wear Resistance Tests on Unhardened and Hardened Sheet Steel for Conveyor Chutes.** K. Wellinger and H. Uetz. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 26, September 11, 1953, p. 906-910.

Tests made to determine relative usefulness of soft and hard sheet steel. Diagrams, tables, graphs. (Q9, CN)

1000-Q. Some Properties of Low Alloy High Tensile Steel Containing Molybdenum. J. Pow. *Alloy Metals Review,* v. 8, Sept. 1953, p. 2-7.

Effect of a number of common alloying elements on manganese steel, stressing the advantages of molybdenum additions. Graphs, tables, photographs. (Q general, Ay)

1001-Q. Static and Fatigue Properties of Carbon, Silicon, and High-Strength Low-Alloy Steel Plates Having a Hole. Frank Baron and Edward W. Larson, Jr. *American Society for Testing Materials, Preprint* no. 73, 1953, 19 p.

Investigation to determine fatigue strengths, relationship between the fatigue strengths and the stress-strain characteristics, and relative advantages of the various steels for resisting fatigue loadings. Micrographs, graphs. 12 ref. (Q7, Q27, CN, AY)

1002-Q. Survey of Investigations of Effect of Specimen Thickness on Rockwell Tests. R. H. Heyer and V. E. Lysaght. *ASTM Bulletin,* 1953, no. 193, p. 32-39.

Important publications, and some unpublished work which merits attention of those concerned with hardness testing. Graphs, diagrams, table. 8 ref. (Q29)

1003-Q. Correlation of Published Data for Correction of Rockwell Diamond Penetrator Hardness Tests on Cylindrical Specimens. R. S. Sutton and R. H. Heyer. *ASTM Bulletin,* 1953, no. 193, p. 40-41.

Progress report. Tables. 7 ref. (Q29)

1004-Q. The Effects of Cold-Drawing, Microstructure, and Thermal Treatments on the Machinability and Mechanical Properties of Carbon and Alloy Steel. Ford E. Dreves. *ASME, Transactions,* v. 75, Oct. 1953, p. 1219-1232.

Role of cold finished steel mill in field of metal cutting. Photographs, tables, graphs, diagrams. (Q general, G17, CN, AY)

1005-Q. Some Experiments With Sleeve Bearing Metals. Borge Lunn. *Danish Academy of Technical Sciences, Transactions,* 1952, no. 2, 144 p.

Wear and mechanical properties of bearing metals and influence of lubricants. Tables, graphs, micrographs, photographs, diagram. 123 ref. (Q general, Q9, Sn, Pb, Sb, Cu, SG-c)

1006-Q. The Design of Creep-Resisting Steels. E. W. Colbeck, J. R. Rait, and J. O. Ward. *Engineering,* v. 176, Oct. 16, 1953, p. 505-506.

Work and facilities of the Hadfield laboratories. Performance of several high-alloy steels. Photographs, graphs, tables. (To be continued.) (Q3, AY)

1007-Q. Materials for High-Temperature Service. II. Howard C. Cross. *Industrial Heating,* v. 20, Oct. 1953, p. 1986, 1988, 1990, 1992, 1994-1996.

High-temperature mechanical properties of Al, Ti, Cr and Mo. Graphs, table. (To be continued.) (Q general, Al, Ti, Cr, Mo)

1008-Q. How Stable Is Titanium in Vital Operating Range? H. A. Jahnle. *Iron Age,* v. 172, Oct. 22, 1953, p. 116-119.

Stability of titanium alloys from 600 to 900° F. was improved by aging at 500 to 600° F. Graphs, photographs, tables. 3 ref. (Q general, J27, Ti)

1009-Q. The Fatigue Spin Rig, a New Apparatus for Rapidly Evaluating Materials & Lubricants for Rolling Contact. E. F. Macks. *Lubrication Engineering,* v. 9, Oct. 1953, p. 254-258.

Apparatus which permits independent evaluation of variables that affect fatigue life of bearing balls, raceways and lubricants over a wide temperature range. Photographs, diagrams. 63 ref. (Q7)

1010-Q. Neutral Holes in Plane Sheet. Reinforced Holes Which Are Elastically Equivalent to the Uncut Sheet. E. H. Mansfield. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 6, Sept. 1953, p. 370-378.

Mathematical formulas to determine shape of a neutral hole and the variation along the hole boundary of the cross-sectional area of the reinforcement. Diagrams. (Q21)

1011-Q. Stress Analysis and Design of Steel Columns. Henson K. Stephenson and Kriss Cloninger, Jr. *Texas Engineering Experiment Station, Bulletin* 129, Feb. 1953, 287 p.

Practical information needed for stress analysis and design of columns and other compression members which will effectively reduce and in some cases eliminate the tedius and time-consuming labor ordinarily required for solving many of the theoretical and practical problems associated with column action. Tables, graphs. (Q25)

1012-Q. Axial-Load Fatigue Tests on Notched and Unnotched Sheet Specimens of 61S-T6 Aluminum Alloy, Annealed 347 Stainless Steel, and Heat-Treated 403 Stainless Steel. Herbert F. Hardrath, Charles B. Landers and Elmer C. Utley, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3017, Oct. 1953, 28 p.

Stress-concentration factors effective in fatigue of notched specimens were found to be less than theoretical elastic values at low stresses and were approximately equal to one at the ultimate strength. Graphs, tables. 11 ref. (Q7, Al, SS)

1013-Q. (English.) **The Fatigue Testing of Structures by the Resonance Method.** R. B. Heywood. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 8, Aug. 1953, p. 249-260.

Machines for testing at or near resonance with special reference to testing of aircraft structures. New "slip clutch" type of exciter. Diagrams, graphs, photographs. 12 ref. (Q7)

1014-Q. (German.) **Silicon-Containing Special Brass as a Casting Material.** E. Pelzel. *Metall,* v. 7, nos. 13-14, July 1953, p. 509-513.

Influence of Si on mechanical properties and crystalline structure of brass containing 60 to 50% copper. Photographs, graphs, tables. 8 ref. (Q general, M26, Si, Cu)

1015-Q. (German.) **Evaluating the Bearing Properties of Bearing Materials. XI. A Friction-Bearing Testing Machine for Stationary Loads.** C. M. von Meysenbug. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 755-758.

MPA-Darmstadt friction-bearing testing machine which permits recording of friction, temperature, and stresses in bearings. Diagrams, photographs. 8 ref. (Q9, Q25)

1016-Q. (German.) **Evaluation of Bearing Materials by Present-Day Status of Experience.** R. Kühnel. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 759-766.

Literature on testing. Tables, graphs. 13 ref.
(Q9, Cu, Pb, Al, Zn, Mg, Si)

1017-Q. (German.) **On the Concept of Strain Hardening.** W. Späth. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 772-778.

Several definitions and tests to demonstrate the principle. Diagrams, graphs. 13 ref. (Q24)

1018-Q. (German.) **Influence of Flame Cleaning on Properties of Steels.** H. Kemper and W. Pomaska. *Schweissen und Schneiden,* v. 5, no. 7, July 1953, p. 256-267.

Recommends working with highest possible gas-flow velocities and up to 50% excess oxygen. Critical temperatures must not be exceeded. Photographs, diagrams, tables, graphs. 4 ref. (Q general, L10, ST)

1019-Q. (German.) **Results of Long-Time Tests on Low-Alloy Steel at 500° C. and Up to 100,000 Hours.** A. Thum and K. Richard. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 8, Aug. 1953, p. 235-245.

Cause of deformationless fractures at high temperatures. Long-time creep and fatigue tests on various steels. Graphs, tables, micrographs. 10 ref. (Q3, Q7, ST)

1020-Q. (German.) **Behavior of Steel at Elevated Temperature.** Alfred Krisch. *Stahl und Eisen,* v. 73, no. 21, Oct. 1953, p. 1349-1355.

Review of literature published in 1951. Change of elastic constants, creep tests, high-temperature property investigations, stress-relief tests and effect of chemical composition. Tables, graphs. 45 ref.
(Q21, Q3, J1, AY, SS, Al, Co, Cr, Fe-p, Mo, Ni)

1021-Q. (Russian.) **Determination of Potential Energy of Residual Deformations.** G. S. Shapiro. *Prikladnaia Matematika i Mekhanika,* v. 17, no. 1, 1953, p. 114-116.

Mathematical solution based mainly on torsional stresses in metallic rods. Graphs. 12 ref. (Q1)

1022-Q. (Russian.) **Endurance of Working Surfaces of Teeth Under Variable Load.** Z. P. Pavlov. *Vestnik Mashinostroeniia,* v. 33, no. 3, March 1953, p. 16-20.

Compares surface wear on nonhardened gears with constant and variable load. Tables, graphs. (Q9)

1023-Q. (Spanish.) **Fatigue Resistance of Structural Steel Specimens Prepared by Oxygen Cutting.** F. Koenigsberger and Z. Garcia Martin. *Ciencia y tecnica de la Soldadura,* v. 3, no. 13, July-Aug. 1953, 10 p.

Internal and external changes. Results compared with those caused by mechanical processes. Photographs, tables, graphs. (Q7, G22, AY)

1024-Q. Carbon in Ferrous Alloys. Harry K. Ihrig and John T. Jarman. *American Foundryman,* v. 24, Nov. 1953, p. 52-57.

Series of experimental heats demonstrating how amount and form of carbon influence ferrous alloys. Effect on mechanical properties, hardenability, and microstructure. Photographs, tables, diagram, graphs. 8 ref. (Q general, J26, M27, CI)

1025-Q. On the Complete Solution to Problems of Deformation of a Plastic-Rigid Material. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 2, Oct. 1953, p. 43-53.

The problem of finding an equilibrium distribution of stress not exceeding the yield point in the assumed rigid regions of a deforming body. Theorems, based on the limit-load theorems of Hill, are given for determining whether such a stress distribution exists. Graphs, diagrams. 10 ref. (Q24)

1026-Q. The Compressibility of Metallic Aluminium. S. Raimes. *Physical Society, Proceedings,* v. 66, no. 406A, Oct. 1953, p. 949-951.

Method of calculating lattice parameter, compressibility and cohesive energy using method relying on assumption that valence electrons in metal are almost free. Graph. (Q28, M26, Al)

1027-Q. Investigation of the Statistical Nature of the Fatigue of Metals. G. E. Dieter and R. F. Mehl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3019, Sept. 1953, 25 p.

Utilizes statistical methods to study the scatter found in aluminum alloys and the effect of the morphology of the carbide phase on scatter in a eutectoid steel. Graphs, tables. 11 ref. (Q7, ST, Al)

1028-Q. Impact Torsion Testing of Bolt Welds. H. E. Dixon and J. E. Roberts. *Welding Research,* v. 7, Aug. 1953, p. 96-98.

New methods of testing designed to investigate more fully possibility of differences in strength. (Q1, K9)

1029-Q. (English.) **The Effect of Temperature and Composition on the Deformation of Single Crystals of Iron.** H. W. Paxton and A. T. Churchman. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 473-479.

Specimens with 0.003 and 0.005% carbon were tested from −180 to 213° C. Cleavage fracture, mechanical twinning, simple and repeated yielding and smooth stress-strain curves were observed in 0.003% carbon iron. Repeated yielding was not observed in 0.0005% carbon alloy. Graphs. 19 ref. (Q24, Fe)

1030-Q. (English.) **Le Chatelier's Principle and Stress-Induced Displacive Transformations.** E. S. Machlin and S. Weinig. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 480-482.

Tests were made on a 9% molybdenum-titanium alloy. Transformation occurred along planes parallel to the planes of maximum shear stress. Graph, micrographs. (Q24, Mo, Ti)

1031-Q. (English.) **Internal Friction of Iron and Molybdenum at Low Temperatures.** Lo-Ching Chang and M. Gensamer. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 483-486.

Peaks were found at 100° K in iron and possibly at 300° K. in molybdenum, corresponding to ductile-brittle transitions in slow tension tests. Graphs, diagrams. 4 ref. (Q22, Mo, Fe)

1032-Q. (English.) **Dimension and Orientation Effects in the Yielding of Carburized Iron Sheet Crystals.** A. N. Holden and F. W. Kunz. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 495-502.

Good correlation was observed between yield behavior and crystal length in the direction of slip except when tensile axis was within 10° of a [111] direction. Micrographs, diagrams. 12 ref. (Q23, Fe)

1033-Q. (English.) **Work Hardening in Face-Centered Substitutional Alloys.** J. S. Koehler. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 508-512.

Experimental data on mechanical properties of single crystals. Source and impurity hardening are shown to be more important than interference hardening. Experiments suggested. Graphs, micrographs. 17 ref. (Q general)

1034-Q. (English.) **Energy Absorption and X-Ray Studies of Kink Formation in Zinc Single Crystals.** E. I. Salkovitz and J. S. Koehler. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 552-567.

Experiments revealed two consecutive stages are involved. A qualita-

tive dislocation model is presented. Tables, graphs, photographs. 7 ref. (Q24, Zn)

1035-Q. (English.) **Study of the Origin of the Cube Texture.** A. Merlini and P. A. Beck. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 598-606.

Cross-rolled copper did not develop cube texture on annealing. Results are in accordance with the oriented growth theory. Graphs, diagrams. 24 ref. (Q24, Cu)

1036-Q. (English.) **Additional Notes on Textures in Extruded Aluminum.** K. V. Gow. *Acta Metallurgica,* v. 1, no. 5, Sept. 1953, p. 610.

Coincidence lattice sites are important in determining orientation dependence of grain boundary migration rates. 3 ref. (Q24, Al)

1037-Q. (English.) **Vibration of Plates Covered With a Damping Layer.** A. Van Itterbeek and H. Myncke. *Acustica,* v. 3, no. 4, 1953, p. 207-212.

Damping effects of a thin layer of bitumin emulsion containing schist powder or similar products on steel plates. Graphs, photographs, diagrams. (Q8, ST)

1038-Q. (German.) **Physics of Permanent Deformations.** W. Späth. *Metall,* v. 7, nos. 17-18, Sept. 1953, p. 679-683.

Certain fundamental phenomena of flow, thermo-electric effect at displacements, internal damping, equilibrium processes, metallurgical microprocesses and tendency toward brittle fracture by metals. Diagrams. 28 ref. (Q24, Q26)

1039-Q. (German.) **X-Ray Lattice-Constant Measurements on Plastically Deformed Steel Specimens.** *Naturwissenschaften,* v. 40, no. 19, Oct. 1953, p. 507-508.

Reviews literature comparing X-ray with mechanical measurements. Graphs. 12 ref. (Q24, M22, ST)

1040-Q. (German.) **Design Strength and Wearing Quality of High-Strength Gear Wheels.** A. Thum and K. Richard. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 9, Sept. 1953, p. 267-278.

Critical discussion on the basis of experiments and review of the literature. Effect of the material, direction of the grain, heat treatment and tooth size and shape. Diagrams. 45 ref.
(Q9, M27, J general, AY)

1041-Q. (German.) **Notched-Bar Impact Testing According to H. H. Schnadt.** Alfred Krisch. *Stahl und Eisen,* v. 73, no. 19, Sept. 10, 1953, p. 1215-1225.

Schnadt's theory is correlated with Huber-von Mises-Hencky hypothesis. Stress ratios for ductile and brittle fracture. Variations of impact testing. Graphs, tables, diagrams, photographs. 36 ref. (Q6, ST)

1042-Q. (German.) **Speeding the Flow of Metals in Paraffin Oil by Addition of Polar Compounds.** Werner Klinkenberg, Kurt Lücke, and Georg Masing. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 362-369.

Experiments made on the effect of surface active substances dissolved in polar compounds on plastic flow of very thin specimens. Attention was paid to Rehbinder effect which was observed on gold. Diagrams, graphs. 36 ref.
(Q24, Au, Zn)

1043-Q. (German.) **Properties of Metallic Melts. VI. Internal Friction of Liquid Silver-Tin Alloys.** Erich Gebhardt, Manfred Becker, and Erich Trägner. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 379-382.

Dependence on temperature and concentration. Graph, table. 14 ref.
(Q22, Ag, Sn)

1044-Q. Nomograph for Determining Course of Tension During Pure Bending for Materials With Linear Solidification. Rudolf Böklen. *Zeitschrift für Metallkunde,* v. 44, no. 8, Aug. 1953, p. 382-386.

Plots flow curve from equilibrium moments during loading and unloading to represent distribution of stresses in rectangular and circular bars. Graphs, diagrams, tables, photograph. 6 ref. (Q27, Q5)

1045-Q. (Polish.) **Low Tin and Tellurium Bearing Alloy.** S. Balicki and W. Babinski. *Prace Instytutow Hutnictwa,* v. 5, no. 2, 1953, p. 82-88.

Investigations on mechanical properties have shown no great changes when treated at temperatures up to 100° C. Tables, graphs, micrographs. 7 ref.
(Q general, Sn, Te, SG-c)

1046-Q. (Portuguese.) **Relationship Between the Brinell Hardness and the Microstructure of Ordinary Lamellar-Graphite Cast Iron.** Werner Grundig. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 31, Apr. 1953, p. 169-188.

Experimental investigation on 80 specimens. 23 ref. (Q29, M27, CI)

1047-Q. (Russian.) **Impact Strength of Welded Joints of Railroad Cars of Openhearth and Bessemer Steel.** S. V. Vershinski. *Avtogennoe Delo,* v. 24, no. 6, June 1953, p. 5-10.

Brittle fracture of bessemer steel and plastic deformation of openhearth steel. Diagrams, tables, photographs. (Q6, K general, ST)

1048-Q. (Russian.) **Investigation of Antifriction Properties of Chromium With Mechanical Porosity.** D. N. Garkunov and A. A. Poliakov. *Vestnik Mashinostroeniia,* v. 33, no. 6, June 1953, p. 65-67.

Compares mechanical and electrolytic porous chromium for wear and friction coefficients. Photographs. (Q9, Cr, CI)

1049-Q. (Swedish.) **Correlation Between Tensile Strength and Casting Dimension for Gray Cast Iron.** M. Itzel and E. O. Lissell. *Gjuteriet,* v. 43, no. 8, Aug. 1953, p. 143-147.

Numerous tests. Probable minimum tensile strengths calculated for round and rectangular cross sections of various sizes. Diagrams, graphs. 9 ref. (Q27, CI)

1050-Q. (Pamphlet.) **The Nimonic Alloys.** Ed. 2. 41 p. 1952. Henry Wiggin & Co., Ltd., Birmingham, England.

Data on mechanical properties of Nimonic alloys are presented in tabular form. (Q general, Ni)

1051-Q. (Book.) **Properties of Metallic Surfaces.** 368 p. Institute of Metals, 4 Grosvenor Garden, London, S.W. 1, England. 35s. ($5.50)

Symposium held by the Metal Physics Committee of Institute of Metals. Discusses 13 papers showing importance of surface finish as contributing to strength, service performance and life of a metal component, Includes: "Specialized Microscopical Techniques in Metallurgy", S. Tolansky; "Radioisotopes in the Study of Metal Surface Reactions in Solutions", M. T. Simnad; "Influence of Machining and Grinding Methods on the Mechanical and Physical Condition of Metal Surfaces", Peter Spear, Ian R. Robinson and K. J. B. Wolfe; "Effect of Lubrication and Nature of Superficial Layer After Prolonged Periods of Running", F. T. Barwell; "Crystalline Character of Abraded Surfaces", P. Gay and P. B. Hirsch; "Effect of Surface Conditions on the Mechanical Properties of Metals, Mainly Single Crystals", E. N. da C. Andrade; "Effect of Surface Condition on the Strength of Brittle Materials", G. C. Gurney; "Influence of Surface Condition on the Strength of Steel", R. J. Love; "Influence of Surface Films on the Friction and Deformation of Surfaces", F. P. Bowden and D. Tabor; "Diffusion Coatings", D. M. Dovey, I. Jenkins and K. C. Randall; "Nature and Properties of the Anonic Film on Aluminum and Its Alloys", H. W. L. Phillips; "Chemical Behavior as Influenced by Surface Conditions", U. R. Evans; "Effect of Method of Preparation on the High-Frequency Surface Resistance of Metals", R. G. Chambers and A. B. Pippard.
(Q general, M general, G17, G18, L general)

SECTION R

CORROSION

1-R. New Copper Alloy Has High Stress-Corrosion Resistance. C. H. Hannon. *Iron Age,* v. 170, Nov. 20, 1952, p. 131-133.

New Cu-base Cu-Ni-Si alloy shows high resistance to stress-corrosion failure. Addition of critical amounts of Fe gave improved properties. While excellent properties were found in sand cast and hot-forged parts, highest mechanical properties were developed by successive solution and aging heat treatments. (R1, Cu)

2-R. How to Cut Corrosion Losses With Magnesium Anodes. R. D. Taylor. *Modern Metals,* v. 8, Nov. 1952, p. 49-51.

Use of Mg anodes to take burden of natural galvanic corrosion and leave other metals relatively untouched. (R10, Mg)

3-R. Corrosion Prevention in Hot Water Storage Tanks. R. F. Walker. *Ontario Hydro Research News,* v. 4, July-Sept. 1952, p. 13-16.

Corrosion can be mitigated either mechanically by insulating metal with a protective coating or electrically by providing cathodic protection. Latter can be applied by use of an external source of direct current that increases the negative potential of the object to be protected in relation to its surroundings; or by formation of a galvanic cell that utilizes a metal high in the electromotive series such as an expendable Mg anode. Photographs. (R4, Mg)

4-R. The Use of Graphite Anodes for Cathodic Protection of the Bottoms of Inactivated Ships. J. P. Oliver. *Applications and Industry,* Nov. 1952, p. 324-329.

Some technical problems involved in investigations. Economy afforded by use of cathodic protection. Tables and graphs. (R10, CN)

5-R. Measurement of Cathodic Protection Currents From Sacrificial Anodes. H. N. Hayward and R. M. Wainwright. *Applications and Industry,* Nov. 1952, p. 350-352.

Brief description. Diagrams. (R10)

6-R. Aluminum Foil Protects Aircraft Parts. *Canadian Metals,* v. 15, Nov. 1952, p. 48.

Use of Al foil for corrosion protection of steel parts. (R10, Al, ST)

7-R. Uniform Test Procedures Evaluate Corrosion Resistance of Titanium. G. C. Kiefer. *Iron Age,* v. 170, Dec. 4, 1952, p. 170-173.

Unalloyed Ti 75A titanium sheet was found far superior to most common metals in resistance to chemical pitting. Corrosion tests were run in many media. In boiling HNO_3 and room-temperature HCl, Ti is better than stainless but in concentrated H_2SO_4 or H_3PO_4, stainless is more resistant. In organic acids, both metals behave similarly. Data are tabulated. (R5, R11, Ti, SS)

8-R. Thermogalvanic Potentials. Nickel in Neutral Sulfate Solution. Dodd S. Carr and Charles F. Bonilla. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 475-482.

Investigation to prepare reproducible Ni electrodes and to measure their thermogalvanic effects. Includes summaries of previous investigations. Extensive tables. 56 ref. (R1, Ni)

9-R. Effect of Stress on Metal Electrode Potentials. Robert E. Fryxell and Norman H. Nachtrieb. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 495-503.

Study on Ag and Au electrodes to obtain fundamental information relevant to stress-corrosion phenomena and to the problems of preparing reproducible and stable metal electrodes for laboratory use. Diagrams, tables, and micrographs. 11 ref. (R1, Ag, Au)

10-R. Anodic Behavior of Iron in H_2SO_4. J. H. Bartlett and Lee Stephenson. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 504-512.

The steady state characteristics of the cell Fe H_2SO_4 (aq) Pt, on observations of the anode surface with the aid of a microscope, and on the behavior of the cell current after it has been interrupted for a short time (less than 0.02 to 0.03 sec.). Graphs and tables. 17 ref. (R1, Fe)

11-R. The Nature of the Films Formed by Passivation of Iron With Solutions of Sodium Phosphate. M. J. Pryor, M. Cohen, and F. Brown. *Journal of the Electrochemical Society,* v. 99, Dec. 1952, p. 542-545.

Study in which weights of ferric phosphate present in films formed by the passivation of iron in 0.1M solutions of disodium and trisodium phosphate were determined using a radioactive tracer, and the thickness of oxide was estimated by an electrochemical method. (R10, Fe)

12-R. An Air-Cooled Metal Probe for the Investigation of the Corrosive Nature of Boiler Flue Gases. G. G. Thurlow. *Journal of the Institute of Fuel,* v. 25, Nov. 1952, p. 252-255, 260.

Investigtaion applied to carbon steel. Results obtained indicate that there is a general relationship between weight of acid condensed and quantity of iron corroded and also that a peak occurs in rate of corrosion some 50-100° F. below acid dewpoint. Tables and graphs. 10 ref. (R9, R11, CN)

13-R. Some Problems Associated With Lubrication of Large Engines. *Lubrication,* v. 38, Nov. 1952, p. 137-148.

Cylinder lubricators and bearing corrosion. Tabulated information on corrosion properties and bearing materials. Crankcase explosions, engine deposits, and engine wear. Tables, photographs, and micrographs. (R7, Q9, SG-c)

14-R. Lower Oxides of Titanium. A. E. Jenkins. *Metal Progress,* v. 62, Nov. 1952, p. 108-109.

Formation of $TiO_{1.3}$ and $TiO_{1.8}$ during an investigation of the high-temperature oxidation of Ti and its alloys. (R2, Ti)

15-R. Here's a New Method of Inhibiting Corrosive Wells. J. R. Marshall. *Oil and Gas Journal,* v. 51, Dec. 8, 1952, p. 105.

Device for injecting inhibitors into wells. Diagrams. (R10)

16-R. Digester Corrosion Measurement. Nicholas Shoumatoff. *Tappi,* v. 35, Nov. 1952, p. 494-499.

Data on sequential wall-thickness measurements, with particular emphasis on quantitative analysis of the data, as an illustration of the study of corrosion in a typical sulfate-pulp digester. Investigation was made of validity of inspection procedure with Audigage thickness tester, of local variations of thickness and corrosion within the vessel, and of best means for interpreting routine inspection data. Tables. (R11, CN)

17-R. Pumping Well Service Costs Cut by Corrosion Control. Bryant W. Bradley. *World Oil,* v. 135, Dec. 1952, p. 214, 216, 218, 226.

Corrosion control measures in sweet and sour oil wells. (R10)

18-R. Prevention of Corrosion in Cooling Water. R. C. Ulmer and J. W. Wood. *Corrosion,* (Technical Section), v. 8, Dec. 1952, p. 402-406.

General considerations involved in reducing corrosion by several types of cooling water systems. Treatments include pH control, addition of anti-biologicals, insulation to stop stray current corrosion, and oxygen removal. Information on laboratory research on inhibitors by Drew Co. Charts, diagrams, and tables. (R10, R4, CN, Cu)

19-R. Soil Resistivity Measurements for Corrosion Control. F. O. Waters. *Corrosion,* (Technical Section), v. 8, Dec. 1952, p. 407-409.

Results of experiments to determine most practical soil survey procedure and best equipment. Several types of equipment for determining soil resistivity with good and bad points of each. Rules for interpretations of results, and use of soil resistivity determinations indicative to types of coating. (R8)

20-R. The Inhibition of Sodium Trichloroacetate Weed Killer Solutions. F. N. Alquist and J. L. Wasco. *Corrosion,* (Technical Section), v. 8, Dec. 1952, p. 410-412.

Addition of small amounts of $Na_2Cr_2O_7$ to sodium trichloroacetate was found to inhibit corrosiveness on various metals. Presence of an oil layer at air-liquid interphase prevents much of the liquid-level corrosion. Data for action on steels, Al, and brass are tabulated. (R10, ST, Al, Cu)

21-R. Effect of Titanium in Galvanic Corrosion. Henry Paige and Sara J. Ketcham. *Corrosion* (Technical Section), v. 8, Dec. 1952, p. 413-416.

A series of laboratory tests was performed in which various metals were coupled to either stainless steel or Ti in normal NaCl. Data indicate that electrochemical behavior of Ti and stainless steel is similar under test conditions. Mechanical testing

of heat treated specimens reveals that exposure to oxidizing conditions above 1000° F. has a deleterious effect on ductility of Ti as well as its resistance to stress-corrosion conditions. (R1, Q23, Ti, SS)

22-R. Corrosion of Carbon Steel in Gas Processing Plants. D. E. McFaddin. *Gas,* v. 28, Dec. 1952, p. 105-106.

Reactiveness of CO_2 and H_2S in gas processing plants. Preventative measures such as protective films. Stress-corrosion. (R9, L general, CN)

23-R. The Corrosion Resistance of Electrodeposited Tin-Nickel Alloy. S. C. Britton and R. M. Angles. *Journal of the Electrodepositors' Technical Society,* v. 27, 1951, p. 293-322. (Preprint.)

Tests carried out with electrodeposits of Sn-Ni alloy (65% tin) using exposure to natural and simulated atmospheres for deposits up to 0.001 in. thick and using a wide variety of agents for thick pore-free coatings. Alloy is cathodic to steel and brass. Tables. 10 ref. (R11, L17, Sn, Ni)

24-R. Corrosion of Galvanized Steel in Soils. Irving A. Denison and Melvin Romanoff. *Journal of Research of the National Bureau of Standards,* v. 49, Nov. 1952, p. 299-314.

Measurements of corrosion of galvanized steel and of bare steel and Zn as reference materials after exposure to different soil conditions for a maximum of 13 years. From analysis of data on corrosion of galvanized specimens having different weights of coating, minimum coating requirements for different environmental conditions are suggested. Tables, photographs, and graphs. (R8, L16, ST, Zn)

25-R. Corrosion of Low-Alloy Irons and Steels in Soils. Irving A. Denison and Melvin Romanoff. *Journal of Research of the National Bureau of Standards,* v. 49, Nov. 1952, p. 315-324.

Measurements of corrosion of ten low-alloy irons and steels exposed to 14 soils for periods up to 13 years. Magnitude and progress of corrosion as determined by weight-loss and pit-depth measurements are correlated with composition of materials and nature of environmental conditions to which test specimens were exposed. Photographs, tables, graphs. (R8, AY)

26-R. Corrosion Proofing Grumman War Planes. Frank L. Bonem. *Products Finishing,* v. 17, Dec. 1952, p. 24-32, 34, 36, 38.

How Grumman meets Navy specifications for corrosion proofing. (R10, L general)

27-R. (Book—French.) (Introduction to the Study of Metallic Corrosion in the Petroleum and Chemical Industries.) Introduction a l'Etude de la Corrosion Métallique dans les Industries Pétrolieres et Chimiques. M. Ballay, J. Bénard, G. Chaudron, J. Duflot, P. Lacombe, and A. Portevin. 219 pages. 1952. Societe d'Edition d'Enseignement Superieur, 99 Boulevard St. Michel, Paris. 1750 Fr.

Lectures and practical work which formed a course on corrosion phenomena. General discussion on principles of corrosion and on the protection of metals; relationship between corrosion and surface condition; corrosion testing; chemical and electrochemical corrosion; intercrystalline corrosion and stress-corrosion; application of electrochemical theory to prevention of corrosion; pickling of iron and steel; corrosion of metals and alloys by gases at elevated temperatures, resistance of Ni and its alloys to corrosion; and use of stainless steels in the petroleum industry. (R general)

28-R. (Book.) **A Manual on Underground Corrosion.** 37 pages. Columbia Gas System Corp., 79 N. 3rd St., Columbus 15, Ohio. 75c.

A roundup of latest information on corrosion causes and corrective measures, illustrated with line drawings. Written so layman can understand. (From review in **Iron age**) (R8)

29-R. High-Vacuum Concentration: Its Realm in the Chemical Industry. *Chemical Engineering Progress,* v. 48, Dec. 1952, p. 589-593; disc., p. 593.

Reduction of corrosion and scale problems as found in concentration processes in the chemical industry. Treats the reduction of scale formation by lowering of temperature and pressure and investigates possibility of material substitutions due either to corrosive properties or to strength of materials. Graphs and diagrams. (R2)

30-R. Lubricating Large Engines. Brian Corrigan. *Diesel Power and Diesel Transportation,* v. 30, Dec. 1952, p. 50-54.

Problems associated with lubrication of large gas, dual-fuel, and diesel engines. Bearing corrosion, engine deposits, and engine wear. Tables, micrographs, and photographs. (R7, Q9)

31-R. Season Cracking of Manganese Brass Propellers. Yoshio Kaneda. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952. p. 637-644.

Tests for season cracking in man-

ganese brass propellers. Acidified $FeCl_3$ solutions gave cracks similar to service failures due to residual stresses. (R1, R11, Q25, Cu)

32-R. A Modified Method for the Estimation of Corrosion Due to the Free Sulfur and Sulfur Compounds in Oils. Richard A. Patton and Joseph H. Lieblich. *ASTM Bulletin*, Dec. 1952, p. 59-66.

Optical phenomena involved are examined in order to permit an estimation of reliability of present procedure of visual examination. Modified procedure for study of Cu and an appraisal of its merit. Direct comparison of the two procedures. Graphs, tables. (R11, Cu)

33-R. The High-Temperature Oxidation of Some Cobalt-Base and Nickel-Base Alloys. A. Preece and G. Lucas. *Journal of the Institute of Metals*, v. 20, Dec. 1952, p. 219-227.

Oxidation characteristics of Co and Ni in temperature range 800-1200° C. Simple apparatus was designed to supply atmosphere similar to that produced in gas turbines. Reactions occurring within scales are compared with mixtures of oxides heated to similar temperatures. Spinel formation is shown to be detrimental to formation of a protective oxide. Tables, graphs, and micrographs. (R2, Co, Ni)

34-R. Some Observations on Corrosion in Engineering. S. F. Dorey. *Journal of the Institute of Petroleum*, v. 38, Nov. 1952, p. 885-907; disc. p. 907-918.

Corrosion forms in steam boilers, effect of high temperature, external corrosion of boilers, and caustic cracking; in machinery, marine shafting, oil corrosion, and fretting corrosion; and in oil-process plants. Corrosion due to seawater, dezincification of brasses, H_2 attack in steel, "weld decay" of austenitic steel, cast iron corrosion, cathodic protection. (R general, Cu, ST, CI)

35-R. The Influence of Carbon Content on the Acid Resistance of Titanium and Niobium-Stabilized 18 Cr, 8-14 Ni Steels. H. T. Shirley and J. E. Truman. *Journal of the Iron and Steel Institute*, v. 172, Dec. 1952, p. 377-380.

Influence of 0.03-0.16% C on intercrystalline corrosion of 18% Cr, 8-14% Ni steels containing Ti or Co. Tables and micrographs. (R1, SS)

36-R. Fretting Corrosion—What It Is, Its Cause and Possible Preventives. Arthur H. Allen, *Metal Progress*, v. 62, Dec. 1952, p. 71-76.

Experimental work aimed at determining correctives for field troubles arising from corrosion in aircraft engines. Photographs and micrographs. (R1, CN, SS, AY, Cu, Al)

37-R. Subsurface Porosity Developed in Sound Metal During High-Temperature Corrosion. Anton deS. Brasunas. *Metal Progress*, v. 62, Dec. 1952, p. 88-90.

Experiments showed that identical effects were obtained in metal-liquid and metal-gas systems where similar diffusion phenomena occurred. Micrographs. (R2, Ni, Cr, Fe)

38-R. How We Cured Condenser Tube Corrosion. H. Weldingh. *Power*, v. 97, Jan. 1953, p. 78-79.

Cause of the corrosion and its cure. Micrographs. (R4)

39-R. Danger! Boiler Scale at Work. Paul Brindisi. *Power*, v. 97, Jan. 1953, p. 84-86.

Problems encountered from scale formations, and its removal by chemical means and acid cleaning. (R4)

40-R. Pad With Neoprene to Save Critical Parts From Corrosion and Water. *Power*, v. 97, Jan. 1953, p. 103-105.

Application of synthetic primer to metal equipment, and how machinery life can be prolonged. (R10, L26)

41-R. Grounding and Corrosion Protection on Underground Electric Power Cable Sheaths and Oil or Gas-Filled Pipe Lines. Robert J. Kuhn. *Power Apparatus and Systems*, Dec. 1952, p. 990-993.

Use of Zn and Cu polarizing cells to ground and prevent corrosion in Pb, black iron, and steel pipes. 4 ref. (R10, Zn, Cu, Pb, CI, ST)

42-R. (French.) Observations on the Behavior of Light Alloys and Heterogeneous Assemblies Exposed to Corrosion by Marine Atmospheres. A. Guilhaudis. *Revue de Metallurgie*, v. 49, Nov. 1952, p. 791-799; disc., p. 799-800.

Test installations and procedures. Results of corrosion and mechanical tests on Al, Mg, and their alloys and on assemblies of light alloys with steel. Advantages of light alloy bolts and screws. Photographs, charts, and tables. (R3, Q general, Al, Mg, CN)

43-R. (German.) The Corrosion of Different Steels in Liquefied Sulfur Dioxide. J. Bollinger. *Schweizer Archiv für Angewandte Wissenschaft und Technik*, v. 18, Oct. 1952, p. 321-342.

Experimental studies on the corrosive effect of SO_2 alone and with O_2 and/or H_2O on different metals under a variety of conditions. Tables and graphs. 32 ref. (R6, ST)

44-R. (German.) The Influence of Alloy Additions and Treatment With Metal Oxide Vapors Upon the Rate of Oxidation of Nickel and Titanium. Harald Pfeiffer and Karl Hauffe. *Zeitschrift für Metallkunde*, v. 43, Oct. 1952, p. 364-369.

Experimental arrangement. Cr and Ag were used as alloy additions, and Li_2O and WO_2 as vapors. Results are tabulated and charted. 23 ref. (R2, Ti, Ni)

45-R. Behavior of Shipbottom Paints Subjected to Cathodic Protection. R. P. Devoluy. *Corrosion*. v. 9, Jan. 1953, p. 2-8; disc., p. 8-10.

Investigation to determine whether cathodic protection can be applied to operating ships without inactivating antifouling paints associated with areas of bare steel or Zn. Effects of variations in the composition of the paints used and in variations in dried film thickness of anticorrosive paints used in paint systems. (R10, L26, ST, Zn)

46-R. Microbiological Corrosion of Buried Steel Pipe. Frank E. Kulman. *Corrosion*, v. 9, Jan. 1953, p. 11-18.

Field tests of 1943-1949 to determine type and cause of corrosion in buried gas pipes. Microbiological investigation, soil analysis, seasonal variations of corrosion and mechanism of microbiological corrosion. Tables, diagrams. 18 ref. (R1, ST)

47-R. A Laboratory Method for the Study of Steam Condensate Corrosion Inhibitors. Harold Patzelt. *Corrosion*, v. 9, Jan. 1953, p. 19-24.

Investigation to control variables which influence corrosion. Environmental conditions which were considered are temperature, dissolved CO_2 and O_2, pH, electrolytes, liquid velocity with respect to metal, duration of attack. 8 ref. (R10, ST)

48-R. Laboratory Apparatus for Studying Oil Well Subsurface Corrosion Rates and Some Results. Paul J. Kalish, J. A. Rowe, Jr., and W. F. Rogers. *Corrosion*, v. 9, Jan. 1953, p. 25-33; disc., p. 33.

Apparatus and test procedure, effect of released acid gases on bottom hole pH values, effect of velocity and temperature on corrosion rate, corrosion rates of sulfide and nonsulfide brines, and corrosion inhibitors. (R4, R11, ST)

49-R. Designing for Corrosive Services. F. A. Prange. *Corrosion*, v. 9, Jan. 1953, p. 34-37.

Explores basic philosophy of design and examines inter-relationship between processes, corrosion of materials, fabrication and construction of equipment, physical properties required of structures. (R general)

50-R. Statistics. A Useful Tool for the Examination of Corrosion Data. Charles F. Lewis. *Corrosion*, v. 9, Jan. 1953, p. 38-43.

Frequency distributions, preparation, plotting, and interpretation of data, limits of uncertainty, and sample size. (R general, S12)

51-R. The Relation of the Anodic Corrosion of Lead and Lead-Antimony Alloys to Microstructure. J. B. Burbank and A. C. Simon. *Journal of the Electrochemical Society*, v. 100, Jan. 1953, p. 11-14.

Technique for determining relation of microstructure of Pb and its alloys to anodic corrosion in H_2SO_4. Method is used to show how corrosion of Pb and its hypo-eutectic Sb alloys are related to microstructures. Aspects of corrosion taking place in Pb-acid storage battery. Micrographs. 10 ref. (R5, Pb)

52-R. Protection of Exterior Steel Surfaces by Paint. Rick Mansell. *Organic Finishing*, v. 13, Dec. 1952, p. 16-17.

Two types of corrosion of steel under water, and protection offered by organic coatings. Special precautions taken during finishing. (R4, L26, ST)

53-R. (German.) The Influence of Material Chemical Factors on the Corrosion of Metals. W. Feitknecht. *Schweizer Archiv für Angewandte Wissenschaft und Technik*, v. 18, Nov. 1952, p. 368-379.

Seeks to set up certain general principles ccvering the intensity of attack for both surface and localized corrosion. Photographs and 31 ref. (R1)

54-R. (German.) Rate of Solution of Molybdenum in Nitric Acid at 25°. T. G. Owe Berg. *Zeitschrift für Anorganische und Allgemeine Chemie*, v. 269, Aug. 1952, p. 117-119.

Experimental data are charted for various concentrations of HNO_3. 2 ref. (R5, Mo)

55-R. (German.) Dissociation of Nitric Acid. III. Rate of Solution of Copper in Dilute Nitric Acid. IV. Rate of Solution of Aluminium in Nitric Acid. T. G. Owe Berg. *Zeitschrift für Anorganische und Allgemeine Chemie*, v. 269, Sept. 1952, p. 210-217.

Part 3: Experiments at 20° C. Part 4: Effects of concentration and degree of Al purity were determined at 25° C. Data are tabulated and charted. (R5, Cu, Al)

56-R. (German.) Regarding the Variations of Potential of Aluminum. I. Experimental Results. Georg Masing and Dietrich Altenpohl. *Zeitschrift für Metallkunde*, v. 43, Nov. 1952, p. 404-412.

Measurements of Al, subjected to corrosion in NaCl solutions, confirmed existence of short-time variations of electrochemical potential. Procedure; analysis of the oscillogram; potential behavior of Al; influence of selected conditions on variations of potential; and investigation of surface condition during corrosion. Tables, graphs, and photographs. 12 ref. (R1, P15, Al)

57-R. (German.) **Corrosion in Metallic Materials.** M. Werner and W. Ruttmann. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Dec. 1, 1952, p. 1113-1121.

Protective layers and their removal. Causes of intercrystalline, selective, and stress corrosion, resulting from nature of material; also other types, including oxygen corrosion. Various kinds of coatings, including plating. 16 photographs. 18 refs. (R1, R2, L general)

58-R. (Book.) **The Fight Against Rust.** British Iron and Steel Research Association, 11 Park Lane, London W.1, England. 2s. 6d.

The Corrosion Committee's activities in the fields of applied and fundamental research. Exposure tests form the bulk of the applied research, test pieces of steel being exposed to the atmosphere from the Polar Circle to Singapore. (R general)

59-R. The General Motors Research Corrosion Test: A Cyclic Humidity Accelerated Corrosion Test for Sheet Steel. A. J. Opinsky, R. F. Thomson, and A. L. Boegehold. *ASTM Bulletin,* Jan. 1953, p. 47-51; disc., p. 51-53.

New type of precision corrosion test was developed to study corrosion resistances of bare steel specimens for those applications where protective rust of specimens exposed on racks outdoors is not fully realized. Diagrams and graphs. (R11, ST)

60-R. Lead and Lead Alloys. Kempton H. Roll. *Chemical Engineering,* v. 60, Feb. 1953, p. 264, 266, 268, 270, 272, 274, 276, 278, 280.

Corrosion resistant Pb alloys in various forms. Charts illustrate resistance to certain chemicals. (R general, Pb)

61-R. Economics of Corrosion Control for Gas Distribution Systems. A. W. Peabody. *Gas,* v. 29, Jan. 1953, p. 51-53, 58.

General discussion. (R9, CI, CN)

62-R. The Corrosion of Mild Steel and Brass in Chlorinated Water. F. Wormwell and T. J. Nurse. *Journal of Applied Chemistry,* v. 2, Dec. 1952, p. 685-692.

Specially designed apparatus is considered to be generally suited for experiments in flowing waters. Results in relation to effect of chlorination, rate of flow, period of test, and temperature. Tables and photographs. (R4, CN, Cu)

63-R. High-Temperature Oxidation Characteristics of a Group of Oxidation-Resistant Copper-Base Alloys. J. P. Dennison and A. Preece. *Journal of the Institute of Metals,* v. 81, Jan. 1953, p. 229-234.

Influence of small separate additions of Al, Be, Cr, Mg, and Si on high-temperature oxidation of Cu. Composition and microstructure of scales formed were studied and correlated with rates of oxidation. Micrographs and graphs. (R2, Cu)

64-R. The Effect of Cold Work on the Microstructure and Corrosion-Resistance of Aluminium-5% Magnesium Alloys Containing 0-1% Zinc. P. Brenner and G. J. Metcalfe. *Journal of the Institute of Metals,* v. 81, Jan. 1953 p. 261-268.

Experimental data show that presence of Zn has little effect on mechanical properties, but alloy containing 1% Zn shows pronounced precipitation after aging at 70° C., and corrosion attack is greater than in case of 0-0.5% Zn alloys. Explanations of corrosion behavior. Graphs and micrographs. (R2, M27, Q24, Mg)

65-R. Galvanic Corrosion. *Materials & Methods,* v. 37, Jan. 1953, p. 119.

Tabulated information on galvanic series in sea water, with brief explanations of the series, anode and cathode areas, and preventing galvanic corrosion. (R1)

66-R. (French.) **Mechanism of the Effect of Ionized Solutions of Hydrogen Suflide on Iron and Steel.** Paul Bastien and Pierre Amiot. *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences,* v. 235, Nov. 3, 1952, p. 1031-1033.

Experimental results show that brittleness and fracture resulting from contact of Fe and steel with H_2S are due to H_2 penetration. (R2, Fe, CN)

67-R. (French.) **Decohesion and Stress-Corrosion of Nonferrous Metals.** J. Herenguel. *Métaux Corrosion—Industries,* v. 27, Oct. 1952, p. 379-385.

Various mechanisms which make possible localization of attack at grain boundaries. Nature and origin of mechanical stresses, difference of corrosion in various alloys, and decohesion under mechanical stress. Micrographs. 15 ref. (R1)

68-R. (German.) **Why Condenser Tubes of Brass?** Max Werner. *Brenn-*

stoff-Wärme-Kraft, v. 4, Nov. 1952, p. 337-371.

Suggestion is made to replace brass entirely by pure Cu or bronzes, the slight increase of price being far outweighed by advantages. (R4, T27, Cu)

69-R. (German.) **Corrosion Problems of Gas-Piping Systems.** Walter Haurin. *Das Gas-und Wasserfach,* v. 93, Nov. 1, 1952, p. 609-611.

Causes of corrosion, both external and internal. 20 ref. (R9, R3, CN)

70-R. (Norwegian.) **Blade Problems and Protection Against Corrosion in Water Turbines.** A. B. Winterbottom. *Teknisk Ukeblad,* v. 99, Oct. 23, 1952, p. 802-805.

Effect of vibrations and corrosion fatigue on ship-turbine blades made of Cr stainless steels. Data are graphed. 9 ref. (R1, SS)

71-R. Increase in Corrosion Resistance of Phosphate Coatings Upon Subsequent Treatment With Pore-Filling Substances. W. Machu. Henry Brutcher, Translation 2884, 25 pages.

Previously abstracted from *Archiv für Metallkunde.* See item 48-L, 1950. (R10, L14, CN)

72-R. Corrosion of Stainless. David R. Keck. *Canadian Chemical Processing,* v. 37, Jan. 1953, p. 40, 42.

Corrosion types, causes, and reduction by materials and process control. (R1, R2, SS)

73-R. The Corrosion of Domestic Galvanized Hot Water Storage Tanks. I. Laird Newell. *Corrosion,* v. 9, Feb. 1953, p. 46-51.

Factors which lead to Zn becoming cathodic to steel in hot water tanks. Instances pointing to presence of Cu as being a principal agent in rapid dissolution of Zn protective coatings exposed to heated H_2O. Tables, diagrams, and micrographs. (R4, Zn, Cu, CN)

74-R. Economic Aspects of Cathodic Protection. Ray M. Wainwright. *Corrosion,* v. 9, Feb. 1953, p. 51-55.

For pipeline example annual corrosion costs may be from 2-5% of original investment. By proper corrosion control these costs may be replaced by coating and cathodic protection costs which are only 1-2% of original investment. Graphs. (R10)

75-R. The Coupon Technique—A Valuable Tool in Corrosion Testing. H. L. Bilhartz and Howard E. Greenwell. *Corrosion,* v. 9, Feb. 1953, p. 66-72; disc., p. 72-73.

One company's method of using coupons. "Coupon technique" is only method of study which measures effect of both physical and chemical variables of corrosion environment. (R11)

76-R. Corrosion in Industry. Bruce Levelton. *Engineering Journal,* v. 36, Jan. 1953, p. 8-13.

Causes and prevention; examples of effect of corrosion on typical lumbering and paper mill equipment. Exposure tests, and theories for causes of failure, from which preventive measures are prescribed. Special attention is given to corrosion from oxygen and salt water. Photographs. (R general, ST)

77-R. (English.) **Corrosion and Metal Attack in the Steam Water Cycle of the Steam Power Plant.** Frederick G. Straub. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 14, 4 pages.

Causes of solubility of metal in feed water and effects of metal oxides on steel. Results of investigations which were made to define influence of feed water pH on metal solubility. (R4)

78-R. (French.) **Influence of Oxide Layer Scaling on the Results of Accelerated Life Tests of Electrically Heated Wires.** W. Betteridge. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 18, 4 pages.

Three different samples of 80% Ni, 20% Cr wires were tested by a modified procedure in which the wire alternated at intervals of 2 min. between two temperatures, upper one of which remained constant for a series of tests, but lower one was varied from approximately normal temperature (normal test) to upper temperature (continuous heating). (R2, Ni, Cr)

79-R. (French.) **Corrosion of H. P. Boiler Tubes.** M. Reignier. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 32, 7 pages.

Corrosion caused by CO_2, O_2, Fe in suspension and fissures. Tables and charts. (R4, CN)

80-R. (English.) **High-Temperature Corrosion in Power Station Boiler Furnaces and Superheaters.** J. H. Jackson. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 144, 24 pages.

Research conducted by Battelle Memorial Institute. One project involved performance of a group of wrought heat resistant alloys when exposed to furnace atmospheres of a number of different power station units. Another involved determination of means for protecting a Hg boiler from severe tube corrosion resulting when a high-sulfur fuel oil was burned. A third investigation was concerned with

resistance of cast heat resistant alloys to corrosion by oxidizing and reducing flue gases at temperatures to 1090° C. (R7, R9, SG-h)

81-R. Scale Formation on Steel. W. Trinks. *Industrial Heating,* v. 20, Jan. 1953, p. 52, 54.

Formation of scale in combustion or natural atmospheres. (R2, ST)

82-R. Basic Factors in Electrolytic Corrosion. E. F. Wolf. *Iron and Steel Engineer,* v. 30, Jan. 1953, p. 102-105; disc., p. 105-106.

Review of fundamental principles includes factors influencing speed of corrosion, prevention of corrosion, and cathodic protection. Diagrams. (R1, R10)

83-R. Aerobic and Anaerobic Iron Corrosion in Water Mains. C. A. H. von Wolzogen Kühr and L. S. van der Vlugt. *Journal American Water Works Association,* v. 45, Jan. 1953, p. 33-46.

Study of principles involved and need to neutralize anodal and cathodal regions by application of internal protection. Photographs and diagrams. 28 ref. (R4, Fe)

84-R. Observation on Scaling of Iron. W. J. Wrazej. *Journal of Metals,* v. 5, sec. 2, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 265-266.

Preparation of samples and examination. Micrographs. (R2, Fe)

85-R. How Inhibitors Prevent Corrosion in Oil Wells. I. Thomas M. Newell. *Oil and Gas Journal,* v. 51, Feb. 9, 1953, p. 145.

Corrosion, and use of inhibitors in steel pipes. (R10, ST)

86-R. Don't Let Corrosion Eat Up Your Profits. Dan H. Carpenter. *World Oil,* v. 136, Feb. 1, 1953, p. 172-174.

Control measures for prevention of tube and pipe corrosion in oil and gas industry. (R10)

87-R. Pipe Line Corrosion and Cathodic Protection; Part 1. Soil Resistivity Surveys. Marshall E. Parker. *World Oil,* v. 136, Feb. 1, 1953, p. 210-212.

Circuit diagrams. (R10)

88-R. (German.) Quantitative Electro-Osmotic Investigation of the Structure of Colored Films. J. K. Wirth and W. Machu. *Werkstoffe und Korrosion,* v. 3, Dec. 1952, p. 453-460.

Zeta-potential, total cross sectional area, number of pores, capillary radii, distance between pores, and magnitude of water displacement were quantitatively determined. The increase in potential was found to control the corrosion process in coated metals. 12 ref. (R11)

89-R. (German.) Corrosion in the Sugar Industry. Ulrich Stark. *Werkstoffe und Korrosion,* v. 3, Dec. 1952, p. 441-444.

Corrosive action of acidic decomposition products which occur in normally alkaline cane juice. Service observations are compared with laboratory tests using acetic acid and steel samples. (R5, CN)

90-R. Corrosion Factors in Chemical Engineering. F. Howard. *Australasian Engineer,* Dec. 8, 1953, p. 67-71.

Mechanisms of corrosion; corrosion testing; welding and corrosion; choice of materials to resist corrosion; methods of corrosion control; and a factory program against corrosion. (R general)

91-R. Cavitation. E. Crewdson. *Engineer,* v. 195, Jan. 23, 1953, p. 122-123.

Suggests that damage done by cavitation is not consequence of collapse of bubbles, but high pressure and high temperature of gas within bubble can account for observed damage under cavitating conditions. (R2)

92-R. Why Oil Tanks Fail. Henry D. Crane. *Fueloil & Oil Heat,* v. 12, Feb. 1953, p. 68-70, 82.

Corrosion is caused by H_2O in the tanks and not by oil. Preventive measures. Photographs. (R7, ST)

93-R. Behavior of Refractory Oxides in Contact With Metals at High Temperatures. George Economos. *Industrial and Engineering Chemistry,* v. 45, Feb. 1953, p. 458-459.

Apparatus, procedures, and experimental results. Tables. 14 ref. (R2, Be, Zr, Ti, Cb, Mo, Ni, Si)

94-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Feb. 1953, p. 93 A-95 A.

Summarizes corrosion of Al by HNO_3 as a function of temperature. Graphs. (R5, Al)

95-R. Corrosion. Some Problems in the Petroleum Industry. *Petroleum Times,* v. 57, Jan. 23, 1953, p. 63-71, 73-78.

Comprised of "The Use of Paints as Protectives in the Fight Against Corrosion: A Survey of Their Effectiveness", A. D. C. Hamilton; "Cathodic Protection Against Corrosion", G. G. Portch; "Corrosion Problems in Oil Tankers"; and, "Corrosion Control in Oil Refineries." (R7, R10, L26, Al, Ti, AY)

96-R. The Influence of Corrosion on the Cracking of Pressure Vessels. H. R. Copson. *Welding Journal,* v. 32, Feb. 1953, p. 75s-91s.

Forms of corrosion, corrosion from a design viewpoint, stress-corrosion cracking of Fe, stainless steel, Cu alloys, Al alloys, Mg al-

loys, and molten metals. Corrosion fatigue, local attack, intergranular attack, effect of stress on general corrosion, effects of H_2 generated by corrosion, and fields for future research. Photographs, micrographs, and tables. 101 ref. (R1, R2)

97-R. Our Experience With Corrosion. *Chemical Engineering,* v. 60, Mar. 1953, p. 344, 346-348.

Problems of pipelines, valves, lead-lined equipment, paints, and keeping equipment clean. (R5, T29)

98-R. Corrosion Problems in Steam-Jet Vacuum Equipment. David H. Jackson. *Chemical Engineering Progress,* v. 49, Feb. 1953, p. 102-104.

Accelerated corrosion caused by high velocities in nozzle heads. Qualifications of materials used. Diagrams. (R4)

99-R. Corrosion of Iron and Steel by Aqueous Suspensions of Sulphur. T. W. Farrer and F. Wormwell. *Chemistry & Industry,* Jan. 31, 1953, p. 106-107.

Investigates possibility that elementary sulfur stimulates corrosion of iron and steel. 7 ref. (R6, ST)

100-R. The Oxidation of Ferrous Hydroxide. J. E. O. Mayne. *Journal of the Chemical Society,* Jan. 1953, p. 129-132.

Air-dried material produced by addition of alkalis to ferrous sulphate solution was examined. Results are explained in terms of oxidation and hydrolysis of a basic sulfate in relation to corrosion of ferrous metals. (R5, Fe)

101-R. Corrosion Tests on Bare and Clad Magnesium Sheet. B. J. Nelson. *Modern Metals,* v. 9, Feb. 1953, p. 63-65.

High-strength Mg alloy sheet can be clad with a protective layer of corrosion resistant alloy. Under corrosive conditions cladding serves as a sacrificial protection for core material. Micrographs and tables. (R11, L22, Mg)

102-R. How Inhibitors Prevent Corrosion in Oil Wells. Part 3. Thomas M. Newell. *Oil and Gas Journal,* v. 51, Feb. 23, 1953, p. 207.

Experiments using steel plates and inhibitors. Properties of efficient inhibitors. (R10, ST)

103-R. Corrosion. An Engineering Problem. Marshall E. Parker. *Petroleum Engineer,* v. 25, Feb. 1953, p. D3-D14.

Emphasizes need of properly trained engineers for designing and applying principles of corrosion to equipment. (R general, A3)

104-R. Your Corrosion Engineer. F. L. Laque. *Petroleum Processing,* v. 8, Feb. 1953, p. 230-233.

Factors for evaluating a corrosion engineer with respect to his attributes, duties, and results. (R general, A6)

105-R. The Corrosion of Iron and Steel and Its Prevention. J. C. Hudson. *Times Science Review,* Spring 1953, p. 14-15.

Mechanism, causes, and protective coatings. Graphs and photographs. 14 ref. (R general, ST)

106-R. (French.) **Considerations on the Passivity of Metals.** R. Piontelli. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 51-89; disc., p. 89-92.

Defines various states of passivity and emphasizes correlation to nature of a metal. Theoretical discussion is included. 31 ref. (R10)

107-R. (French.) **Passivation and Activation Potentials of Iron, Cathodic Corrosion of Iron in the Presence of Oxygen.** M. Pourbaix and J. Feron. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 128-133; disc., p. 133-134.

Anodic and cathodic polarization curves for Fe determined in presence of 0.1 M aqueous solution of $NaHCO_3$ (pH=8.4), free of O_2, and saturated in O_2 under 0.2 atm., respectively. Graphs. (R10, P15, Fe)

108-R. (French.) **Passivation of Iron in the Presence of Chloride.** M. Pourbaix and J. Feron. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 134-139; disc., p. 139-140.

Anodic and cathodic polarization curves for Fe, determined in presence of 0.1M aqueous solutions of $NaHCO_3$ (pH=8.4) free of NaCl, and with varying amounts of NaCl, respectively. Graphs. (R10, P15, Fe)

109-R. (French.) **Observations on the Polarization Curves of Stainless Steels in a Strong Acid Medium.** J. M. Defranoux. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 141-145; disc., p. 145.

A study of 18-8 steel (2.5% Mo) in an H_2SO_4 medium. 7 ref. (R5, SS)

110-R. (French.) **Remarks on the Anodic Oxidation of Chromium in Alkaline Solution.** Jean Besson. *Proceedings of the Third Meeting, Berne* 1951. International Committee of Electrochemical Thermodynamics and Kinetics, p. 155-159; disc., p. 159-160.

Studies the above transformation using ferrochromium with 60-65% Cr. (R1, Fe, Cr)

111-R. (French.) **The Chemical Passivation of Metals.** L. Meunier. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 204-212; disc., p. 213.

The behavior of Ag, Cd, Ni, and Co in an HCl-H_3CrO_3 compound. Diagrams. 13 ref.
(R10, Ag, Cd, Ni, Co)

112-R. (French.) **Corrosion and Protection of Metals. Immunity, Passivation, Passivity.** M. Pourbaix. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 464-471.

Discusses the above terms and gives diagrams illustrating these phenomena in metals.
(R10, Zn, Fe, Pb, Ag, Cu)

113-R. (German.) **Passivity of Iron in Acid Solutions.** K. F. Bonhoeffer. *Proceedings of the Third Meeting, Berne* 1951, International Committee of Electrochemical Thermodynamics and Kinetics, p. 47-49; disc., p. 49-50.

Difference between new and previously passivated Fe. Analogy between stimulation of nerves and cathodic activation of passive Fe, as illustrated by travel of the activation wave on a passive iron wire.
(R10, Fe)

114-R. (German.) **Corrosion Phenomena on Cadmium in Sodium Chloride Solutions and Their Interpretation on the Basis of the Potential-pH Diagram of Cadmium.** W. Feitknecht and E. Wyler. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 102-116; disc., p. 116.

Interaction of electrochemical properties of the metal; chemical and thermodynamic properties of products of corrosion; and displacement of ions in solution, especially on the metallic surface. Diagrams and micrographs. 14 ref.
(R5, P15, Cd)

115-R. (German.) **The Structure of Anodically Produced Hydroxide Layers in Cadmium.** K. Huber. *Proceedings of the Third Meeting, Berne 1951,* International Committee of Electrochemical Thermodynamics and Kinetics, p. 117-121; disc., p. 121-122.

Experimental data on determination of structure and chemistry of OH-layers producing metallic passivation. Micrographs. (R10, Cd)

116-R. Bacterial Attack on Buried Piping Regarded as Serious Cause of Rapid Corrosion. Carl G. Deuber. *American Gas Journal,* v. 178, Feb. 1953, p. 31, 35.

Corrosive deterioration caused by bacterial action. (R1, CI)

117-R. Scale Formation in Sea-Water Distilling Plants. H. Hillier. *Engineer,* v. 195, Feb. 6, 1953, p. 208-209; Feb. 13, p. 255-256.

Typical performance of an evaporating plant and a test plant with testing procedures and results. Part 2: Treatment of $CaCO_3$ scale with HCl, H_2SO_4, $NaHSO_4$, $FeCl_3$, organic dispersives, and phosphate compounds. Graphs. (R4)

118-R. Caustic Cracking in Marine Scotch Boilers. W. McClimont. *Engineering,* v. 175, Feb. 13, 1953, p. 219-220.

Intercrystalline fractures which occur in boiler components under influence of static stress concentrations and in contact with fairly concentrated solutions of NaOH. 28 ref.
(R2, R5)

119-R. The Attack of Metals by Free Radicals and Atoms. F. W. Thompson and A. R. Ubbelohde. *Journal of Applied Chemistry,* v. 3, Jan. 1953, p. 27-36.

Discusses a number of examples in terms of thermodynamics, kinetics, and other cases due to transient concentrations of atoms and free radicals. 53 ref. (R1)

120-R. Atmospheric Corrosion and Stress-Corrosion of Aluminium-Magnesium-Silicon Alloys in the Fully Heat-Treated Condition. G. J. Metcalfe. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 269-278.

Corrosion behavior of Al alloys H10-WP and H15-WP in extruded form. Stressed and unstressed specimens were tested by exposure to sea water, river water, and various natural atmospheres. Attack was assessed by visual and microscopical examination and by tensile tests on corroded material. Average tensile test results obtained at intervals during 2-year exposure are summarized in graphs and tables.
(R3, R4, Al)

121-R. Intercrystalline Corrosion in Cast Zinc-Aluminium Alloys. C. W. Roberts. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 301-309.

Susceptibility to corrosion in an air-water-vapor atmosphere at 95° C., and effects of minor elements. Tentative theories are proposed.
(R2, Zn, Al)

122-R. Transgranular Stress Corrosion in Chromium-Nickel Stainless Steels. C. Edeleanu. *Journal of the Iron and Steel Institute,* v. 173, Feb. 1953, p. 140-146.

Corrosion may be due to preferential attack on small quantities of quasi-martensite which form in this

type of steel on straining. Several methods for reduction of corrosion. Tables, photographs, and micrographs. 23 ref. (R1, SS)

123-R. Boiler Tube Corrosion. A. M. Hall and J. H. Jackson. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 31, 1953, p. 68-73, 75, 77, 79, 81.

Research conducted at Battelle Memorial Institute for studying abnormal tube corrosion in a Hg boiler. Experimental procedure. (R4, AY)

124-R. Accelerated Corrosion Test of Stainless Steel Samples in an Effort to Establish Galvanic Attack. J. T. Waber and S. F. Waber. *Metal Progress,* v. 63, Jan. 1953, p. 204, 206, 208. (Condensed by J. T. Waber from Document LA1302, Los Alamos Scientific Laboratory, Nov. 14, 1951.)

Tests to determine whether galvanic corrosion occurs when Type 316 ELC stainless steel plates are welded with Type 347 rod and exposed to halogenous acid fumes. (R11, SS)

125-R. Structure and Corrosion. G. V. Akimov. *Metal Progress,* v. 63, Jan. 1953, p. 230, 232. (Translated and condensed by A. G. Guy.)

Previously abstracted from original. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh.* See item 244-R, 1952. (R general, M27)

126-R. Screening Stainless Steels From the 240-Hr. Nitric Acid Test by Electrolytic Etching in Oxalic Acid. Michael A. Streicher. *ASTM Bulletin,* Feb. 1953, p. 35-38.

Certain characteristics of HNO_3 test necessary for an understanding of relation between the two tests are described. Previously used electrolytic etching methods are reviewed. Micrographs. 8 ref. (R11, SS)

127-R. Caustic Cracking in Steam Boilers. The Intercrystalline Corrosion of Mild Steels. R. N. Parkins. *Chemistry & Industry,* Feb. 28, 1953, p. 180-184.

Theories of intercrystalline corrosion including H_2, precipitation, oxide film, mechanical, and boundary distortion. Prevention of caustic cracking. 52 ref. (R2, CN)

128-R. Liquid Metal Corrosion. Anton de S. Brasunas. *Corrosion,* v. 9, Mar. 1953, p. 78-84.

Nature and extent of interaction between a variety of high and low melting metals. Ti, Ni, Be, Na, V, Ni-Cr alloy, and stainless steels were used in investigations. Micrographs. (R6, Ti, Ni, Be, Na, V, Cr, SS)

129-R. Views on the Mechanism of Pitting Corrosion of Aluminum. P. M. Aziz. *Corrosion,* v. 9, Mar. 1953, p. 85-90.

Thermodynamic calculations were carried out to determine possible corrosion reactions of Al in neutral and near-neutral aqueous solutions. Quantitative electrochemical factors determinating corrosion rate, and qualitative mechanism for initiation and propagation of a corrosion pit in Al. (R2, Al)

130-R. Radiometric Study of the Adsorption Characteristics of Stearic Acid. Stanley L. Eisler. *Corrosion,* v. 9, Mar. 1953, p. 91-94.

Work which establishes feasibility of using radiometric techniques for determining adsorption of polar organic compounds on steel surfaces. Tables. (R11, ST)

131-R. The Present Status of Bacterial Corrosion Investigations in the United States. Carl G. Deuber. *Corrosion,* v. 9, Mar. 1953, p. 95-99.

Characteristics of anaerobic sites; and detection, prevention, and mechanism of bacterial corrosion. 42 ref. (R1)

132-R. Aluminum for Copper. Greater Corrosion Risks? H. A. Liebhafsky and E. W. Balis. *General Electric Review,* v. 56, Mar. 1953, p. 12-16, 61.

Thermodynamic stability of Al, with respect to corrosion. Micrographs and diagrams. (R1, Al)

133-R. Corrosion Tests in Diamond Drill Crown Recovery Operations. K. G. A. Strachen. *Industrial Diamond Review,* v. 13, Feb. 1953, p. 43.

Tests were made on 14 metals and alloys exposed for 150 days to the fumes of HCl, H_2SO_4, and HNO_3 acids. (R5)

134-R. Correlations Between Parabolic Oxidation of Metals and Properties of Oxides. Andrew Dravnieks. *Journal of the Electrochemical Society,* v. 100, Mar. 1953, p. 95-102.

Demonstrates that empirical parabolic oxidation constants integrate into comparatively coherent trends. These trends may be explained on basis of concepts issuing from present knowledge of diffusion in solids. Graphs. 126 ref. (R2, N1)

135-R. Stress-Corrosion Cracking of Commercially Pure Titanium. George C. Kiefer and Warren W. Harple. *Metal Progress,* v. 63, Feb. 1953, p. 74-76.

Tests using chemical solutions to determine extent of cracking. Photographs and micrographs. (R1, Ti)

136-R. The Oxidation of Iron Around 200° C. W. H. J. Vernon, E. A. Calnan, C. J. B. Clews, and T. J. Nurse. *Proceedings of the Royal Society,* v. 216, ser. A, Feb. 10, 1953, p. 375-397.

Phenomena associated with a critical temperature at about 200° C. in oxidation of mild steel sheet in air were investigated by gravimetric, microchemical, and electron-diffraction methods. Graphs and tables. 29 ref. (R2, CN)

137-R. Prevention of Rust. Herbert H. Uhlig. *Technology Review,* v. 55, Mar. 1953, p. 251-254, 288, 290.

History, mechanism, and application of cathodic protection. (R10, CN)

138-R. (German.) **Corrosion of Passive Iron in Sulfuric Acid.** U. F. Franck and K. Weil. *Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie,* v. 56, no. 8, 1952, p. 814-822.

Simultaneous measurement of corrosion and current voltages at passive Fe electrodes in dilute H_2SO_4, were used to show that current density and corrosion reach equilibrium and are independent of potential. 16 ref. (R5, R1)

139-R. (Book.) **Corrosion of Buried Metals: A Symposium.** 153 pages. July 1952. Iron and Steel Institute, 4 Grosvenor Gardens, London S.W.1, England. 15s.

Consists of Special Report No. 45, which contains text of papers presented at symposium together with discussion on corrosion of buried metals. (R8)

140-R. Stainless Steel—Properties of Material. H. R. Dalziel. *Australasian Engineer,* Jan. 7, 1953, p. 53-58.

Physical, mechanical, and corrosion resisting properties which are of interest to chemical and welding engineers. Tables. (R general, Q general, SS)

141-R. Lead Cyanamide. Use in Anti-Rust Paints. H. Zirngibl. *Iron & Steel,* v. 26, Mar. 1953, p. 101-105. (Translated from *Fette und Seifen,* v. 53, p. 740-746.)

Analyzes Pb cyanamide to determine effectiveness for preventing corrosion. Micrographs and photographs. (R10, L26)

142-R. The Role of Tannates and Phosphates in the Preservation of Ancient Buried Iron Objects. T. W. Farrer, L. Biek, and F. Wormwell. *Journal of Applied Chemistry,* v. 3, Feb. 1953, p. 86-96.

The lack of corrosion was due mainly to inhibition of the activity of sulphate-reducing bacteria by tannates present in the soil. Photographs and tables. (R10, Fe)

143-R. The Effect of Climate and Atmospheric Pollution on Corrosion. J. C. Hudson and J. F. Stanners. *Journal of Applied Chemistry,* v. 3, Feb. 1953, p. 86-96.

Results of routine observations on the corrosion of small specimens of ingot iron and Zn. Tabulates data which relate to 20 separate annual tests. Graphs and tables. (R3)

144-R. How to Combat Erosion in Fluid Cat Cracker. J. S. Clarke. *Oil and Gas Journal,* v. 51, Mar. 23, 1953, p. 262-264, 268-269, 272, 276.

Program to discover factors involved in erosion. Slide-valve and grid erosion, cyclones, overhead lines, and water sprays. Diagrams and photographs. (R1)

145-R. Effect of Hydrogen Sulphide Upon Turbine Blades. A Splittgerber. Henry Brutcher Translation 2909, 7 pages. (From *Vom Wasser,* v. 17, 1949, p. 140-145.)

Causes of stress-corrosion cracks in blades of 5% Ni and other steels. Experimental data and results. (RI, AY, SS)

146-R. Effect of Various Alloying Elements on the Properties of Cast Iron, Particularly on Thermal Stability. H. Timmerbeil. Henry Brutcher Translation 2914, 10 pages.

Previously abstracted from *Giesserei.* See item 163-R, 1951. (R2, E25, CI)

147-R. Role Played by Nitrogen in High-Temperature Oxidation of Titanium in Air. V. I. Arkharov and G. P. Luchkin. Henry Brutcher Translation 2921, 8 pages.

Previously asbstracted from *Doklady Akademii Nauk SSSR.* See item 360-R, 1952. (R2, Ti)

148-R. Dissolution of Steel in Sulfuric Acid Under the Influence of Ultrasound. A. P. Kapustin and M. A. Fomina. Henry Brutcher Translation 2944, 5 pages.

Previously abstracted from *Doklady Akademii Nauk SSSR.* See item 361-R, 1952. (R5, ST)

149-R. Influence of Composition of Stainless Steels Upon Resistance to Sulfuric and Hydrochloric Acids. K. Bungardt and H. J. Rocha. Henry Brutcher Translation 2963, 8 pages.

Previously abstracted from *Werkstoffe und Korrosion.* See item 301-R, 1952. (R5, SS)

150-R. Making and Using Glassed Steel Vessels. *Canadian Chemical Processing,* v. 37, Mar. 1953, p. 54, 56, 58.

Construction details and corrosion resistance data. (R general, L27, ST)

151-R. Corrosion of Materials by Liquid Low Melting Alloys. *Materials & Methods,* v. 37, Mar. 1953, p. 131.

Tabulated information includes ferrous and nonferrous metals and nonmetals. (R6)

152-R. How You Can Fight Corrosion. Allen G. Gray. *Steel,* v. 132, Apr. 6, 1953, p. 102-106, 108.

Factors involved in corrosion, and utilization of available means of combating it. Photographs. (R general)

153-R. (German.) The Prevention of Corrosion by Dehydration of the Atmosphere. Heinrich Netz. *Werkstoffe und Korrosion,* v. 4, Jan. 1953, p. 2-4.

Basic theoretical principles and some practical applications. Numerical problems were solved by the use of an i-x diagram for moist air. (R3)

154-R. (German.) Influence of Impurities on Corrosion Resistance of Aluminum and Its Alloys. Erich Franke. *Werkstoffe und Korrosion,* v. 4, Jan. 1953, p. 4-14.

Influence was determined by the type of corrosive medium. Frequently the failure of Al was due to service or other conditions rather than to impurities. (R general, Al)

155-R. (German.) On Potential Variations of Aluminum. Part II. Theoretical Consideration. Georg Masing and Dietrich Altenpohl. *Zeitschrift für Metallkunde,* v. 43, Dec. 1952, p. 433-439.

Electrochemical potential of Al shows irregular, brief variations in salt solution. Microscopic investigation of the corroded surface showed that potential changes are result of H_2 blisters. Diagrams. (R11, Al)

156-R. Bacterial Attack on Buried Piping Regarded as Serious Cause of Rapid Corrosion. (concluded). Carl G. Dueber. *American Gas Journal,* v. 178, Mar. 1953, p. 23, 40.

Methods for detecting bacterial corrosion. (R1, CN)

157-R. Fighting Underground Corrosion at the New Fairless Works. How Piping and Other Services are Protected. William E. Coleman and Harold G. Frostick. *Heating, Piping, & Air Conditioning,* v. 25, Apr. 1953, p. 85-87.

Features of the system are elimination of bare Cu underground, Mg anodes, insulating coverings, and design of ground bed installations. (R8, Cu, Mg, ST, Pb)

158-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Apr. 1953, p. 93A-95A.

Use of Cu, which shows good corrosion resistance to H_2SO_4 under nonoxidizing conditions. Graphs and tables. (R5, Cu)

159-R. Embrittlement of Zirconium and Tantalum in Hydrochloric Acid. Lex B. Golden, I. Roy Lane, Jr., and Walter L. Acherman. *Industrial and Engineering Chemistry,* v. 45, Apr. 1953, p. 782-786.

Results obtained with Zr, Zr alloys, and Ta exposed to the corrosive action of concentrated HCl. Graphs and tables. 15 ref. (R5, Zr, Ta)

160-R. Here's What's Happening in Combating Corrosion in Oil and Gas Wells. Gerald L. Farrar. *Oil and Gas Journal,* v. 51, Apr. 1953, p. 106-109, 111, 113.

Reviews reports on combating corrosion in sweet-oil wells and in oil-well casing. Considers inhibitors in condensate wells. (R7)

161-R. Corrosion Control in Cooling Water Systems. W. A. Tanzola. *Petroleum Engineer,* v. 25, Apr. 1953, p. C57-C60.

Factors which interfere in water treatment. Combination methods have solved many problems. Graphs and tables. (R4)

162-R. Gasification of Lignite in a Commercial-Scale Pilot Plant. Progress Report for 1947-48. A. C. Burr, J. C. Holtz, A. W. Koth, and W. H. Oppelt. *U. S. Bureau of Mines,* Report of Investigations 4940, Feb. 1953, 28 pages.

Useful life of outer metal retort tube as influenced by corrosion under a wide range of operating conditions. Gas generation with high ratio of H_2 to CO in both divided and continuous annuli. (R9, B15, AY)

163-R. (German.) Precious Metal Alloys of Particularly High Resistance Against Strong Mineral Acids. J. Schatz. *Chemie Ingenieur Technik,* v. 25, Feb. 1953, p. 61-65.

Corrosion resistant Pt and Au alloys. Test results on Au-Ag-Pd alloys in HCl. (R5, Au, Ag, Pd, Pt)

164-R. (Book.) Oxidation of Metals and Alloys. O. Kubaschewski and B. E. Hopkins. Academic Press, Inc., 125 E. 23rd St., New York 10, N. Y. $6.00. Also Butterworths Scientific Publications, Bell Yard, Temple Bar, E.C.2, England. 35s. net.

After background information on oxidation, there are sections on experimental methods, special theories concerning different types of oxidation, and experimental results relating to the rate of oxidation of various metals and alloys. (R2)

165-R. Evidence of Corrosion Failures in Drill Stem Measures. A. P.

Farr. *Corrosion,* v. 9, Apr. 1953, p. 108-111.

Corrosion fatigue which occurs in drill stems during drilling operations, cracks developing as a result of simultaneous action of cyclic stressing, and corrosion pitting. Diagrams and photographs. 8 ref. (R1, CN)

166-R. Drill Stem Corrosion in West Texas. Stanley C. Moore. *Corrosion,* v. 9, Apr. 1953, p. 112-113; disc., p. 113-114.

Heavy corrosion of drill stem from underlying salt strata. Tests on Mg and Al rings used in drill collarbox. (R8, CN, Mg, Al)

167-R. Electrochemical Behavior of Metals as a Basis for the Study of Corrosion. R. Piontelli. *Corrosion,* v. 9, Apr. 1953, p. 115-122.

Theoretical study of corrosion and passivity; inhibition; and certain factors in plating of metals and alloys. Experimental arrangements for the determination of polarization diagrams. Typical experimental results and some general rules concerning the electrochemical behavior of metals. Graphs and diagrams. 13 ref. (R1)

168-R. Mitigation of Pipe-Line Corrosion. Gerald L. Farrar. *Oil and Gas Journal,* v. 51, Apr. 20, 1953, p. 148, 150, 153.

Information taken from "Cable System Design for Cathodic Protection Rectifiers", R. M. Wainwright, and "Cathodic Protection and High-Resistivity Soils", H. C. Van Nouhuys. Graphs. (R10)

169-R. Test Cooling Water for Corrosion by These Methods. M. C. Forbes. *Petroleum Refiner,* v. 32, Apr. 1953, p. 130-133.

Procedures and results. Diagrams. 9 ref. (R4)

170-R. Corrosion for Pipeliners. Part I. Introduction to Corrosion. Part II. Pipeline Coatings. Starr Thayer. *Pipe Line News,* v. 25, Mar. 1953, p. 21-22; Apr. 1953, p. 44-47.

Part I: Causes of corrosion in steel and general methods of testing. Part II: Use of cold paints, coal tar, and asphalt-base enamels. Special applications and future prospects. (R8, L26, ST)

171-R. Metallic Oxidation. A Simplified Treatment. U. R. Evans. *Research,* v. 6, Apr. 1953, p. 130-137.

Types of oxidation curves, mode of passage through the film, formation of holes, oxidation theories, Cu in O_2 at 1000° C., sulfide and iodide films, influence of boundary reaction, effect of internal boundary reaction, burning of metals, acceleration of attack by Mo and S, and retardation of attack by alloying constituents. Graphs. 53 ref. (R2, Cu, Mo)

172-R. New Alloy Tough on Corrosion. *Steel,* v. 132, Apr. 20, 1953, p. 139.

Physical, mechanical, and corrosion resistant properties of Hastelloy F which is a Ni-Mo-Cr-Fe mixture. (R general, P general, Q general, Ni)

173-R. (French.) **The Oxidation Process of Fe-Cr Binary Alloys at Elevated Temperatures.** Jean Moreau. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, Jan. 5, 1953, p. 85-87.

Results of study on alloys having 2.6, 7.5, 18, 23, and 30% Cr between 800 and 1250° C. (R2, AY)

174-R. (German.) **Faulty Firing as a Cause of Boiler Corrosion.** K. Schwarz. *Brennstoff • Warme • Kraft,* v. 5, Mar. 1953, p. 94-96.

Results of combined action of flue gas depositions and combustion. (R9)

175-R. (German.) **Effect of Inhibitors Upon the Dissolving of Iron in Acid.** J. Elze and H. Fischer. *Metalloberfläche,* v. 6, Dec. 1952, p. A177-A185.

Experimental data. Tables and charts. 9 ref. (R10, Fe)

176-R. Cathodic Protection Can Save Chemical Process Equipment. L. P. Sudrabin. *Chemical Engineering,* v. 60, May 1953, p. 196-200.

Techniques for the prevention of corrosion on buried oil and gas pipelines and on various steel structures submerged in water. Photographs. 12 ref. (R10, ST)

177-R. Protection of Underground Cable Sheaths. T. W. Alexander, Jr. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 97-100; disc., p. 100-102.

Shows that knowledge of stray ground currents helps materially in reducing underground corrosion. Diagrams. (R8)

178-R. The Influence of Ferrous Iron on Bacterial Corrosion. Mary E. Adams and T. W. Farrer. *Journal of Applied Chemistry,* v. 3, Mar. 1953, p. 117-120.

Rate of corrosion of cast iron by the action of sulfate-reducing bacteria is increased by the addition of ferrous Fe alone or the combined addition of ferrous Fe and yeast extract. Specific action of the added ferrous Fe is discussed and the rates of corrosion in hetero-

trophic conditions are compared with those in autotrophic conditions. Graphs. (R1, CI)

179-R. Sodium Benzoate and Sodium Nitrite as Corrosion-Inhibitors in Ethylene Glycol Anti-Freeze Solutions. Part I. Laboratory Investigations. Part II. Investigations in Working Vehicles. F. Wormwell, A. D. Mercer, and H. C. K. Ison. *Journal of Applied Chemistry,* v. 3, Jan. 1953, p. 22-27; Mar. 1953, p. 133-144.

Experimental procedures. Tables and graphs. (R10)

180-R. The War Against Corrosion. A. G. Thomson. *Mining Journal,* v. 240, Apr. 3, 1953, p. 388-390; Apr. 10, 1953, p. 422-424.

Annual losses due to corrosion in the mining industry. Various methods used to combat it.
(R general, T28)

181-R. Resistance of Aluminum to Chemically Contaminated Atmospheres. W. W. Binger, R. H. Wagner, and R. H. Brown. *Modern Metals,* v. 9, Apr. 1953, p. 66-68, 70-72.

Al alloy applications which were developed to suit specific industrial requirements. Factors considered were mechanical properties, resistance to corrosion, workability, machinability, formability, weldability, and color matching. Photographs and graphs.
(R3, Q general, G17, K9, Al)

182-R. How to Mitigate Corrosion in a Glycol-Dehydration Plant. N. K. Senatoroff. *Oil and Gas Journal,* v. 51, Apr. 27, 1953, p. 154, 156, 158, 201, 203-204, 206, 209.

Major factors which influence corrosion rates in dehydration plants, including pressure, fluid velocity, acidity, temperature, and concentration of oxidizing agents. Diagrams and photographs. (R5)

183-R. Influence of Organic Detergents on Metal Corrosion. T. K. Ross. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 183-187.

Reviews some of the more active agents encountered in commercial detergent preparations. Properties of these agents and their reaction to various metals. Graphs. 8 ref. (R7, Cu, CN)

184-R. The Preservation of Oil Tanker Hulls. John Lamb and E. V. Mathias. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 69, Apr. 1953, p. 289-316.

Problems include protection of cargo compartment interiors. Measures already adopted or being considered to reduce corrosion. Tables, graphs, and micrographs. (R10, CN)

185-R. Here's What's Happening in Mitigating Corrosion in Processing Equipment. Gerald L. Farrar. *Oil and Gas Journal,* v. 5, May 4, 1953, p. 101, 103-104.

Information taken from "Inspection of Petroleum-Refinery Equipment," E. H. Tandy; and "Cathodic Protection of Heat-Transfer Equipment," R. W. Stetson and Burke Douglas. Diagrams. (R10)

186-R. Brine Corrosion of Steel Vessels. Cecil O. Smith. *World Oil,* v. 136, May 1953, p. 206, 208, 210, 215.

Cause of corrosion, its prevention by cathodic protection, and costs. Measurement of potential, current, and weight loss under field conditions. (R5, R10, ST)

187-R. In Plant Maintenance Corrosion Poses a Major Problem. R. C. Thiede. *Canadian Metals,* v. 16, May 1953, p. 43-44.

Discusses some of the problems met by the maintenance and repair section of a chemical plant.
(R29, Pb)

188-R. Passivity of Metals. Part XII. Intense Attack at the Water-Line of Otherwise Passive Metal. A. M. Peers and U. R. Evans. *Chemical Society, Journal,* Apr. 1953, p. 1093-1102.

Water-line attack on iron partly immersed in NaCl solution containing phosphate, carbonate or other anodic inhibitor was studied in presence of O_2 without applied current and in absence of O_2 with applied anodic current. Graphs, diagrams. (R10, Fe)

189-R. Caustic Cracking in Steam Boilers. A. A. Berk. *Chemistry and Industry,* Apr. 18, 1953, p. 360-364.

Discusses a number of factors which aid in the prevention of caustic cracking. Tables. (R4, CN)

190-R. The Influence of Potassium Dichromate on Stainless Steel in Deaerated Sulphuric Acid. I. D. G. Berwick. *Chemistry and Industry,* Apr. 25, 1953, p. 408-409.

Briefly reports experiments.
(R5, SS)

191-R. Scale vs. Bare Steel Potential Differences May Explain Unusual Tank Vessel Corrosion. L. M. Mosher. *Corrosion* (News Section), v. 9, May 1953, p. 1-2.

Factors which are significant in determining cause of corrosion.
(R1, CN)

192-R. Hydrogen Blistering of Steel in Hydrogen Sulfide Solutions. T. Skei, A. Wachter, W. A. Bonner, and H. D. Burnham. *Corrosion,* (Technical Section), v. 9, May 1953, p. 163-172.

Laboratory investigations were made of relative influence of environmental factors on the rate and extent of H_2 transmission through carbon steel. Studies include determination of effects of concentration of important constituents such as H_2S, low molecular weight organic acids, NH_3, and HCN. Photographs and graphs. (R11, CN)

193-R. A Laboratory Method for Screening Oil Well Corrosion Inhibitors. J. A. Caldwell and M. L. Lytle. *Corrosion (Technical Section),* v. 9, May 1953, p. 186-187.

Describes a weight-loss test in which accurately weighed mild steel coupons are exposed to corrosive fluids from wells producing sour crude oil. Diagrams. (R11, CN)

194-R. The Inhibition of the Corrosion of Iron by Some Anodic Inhibitors. M. J. Pryor and M. Cohen. *Electrochemical Society, Journal,* v. 100, May 1953, p. 203-215.

Study to determine whether one mechanism of inhibition could be advanced to explain the passivation of Fe by anodic inhibitors in general, since their behavior toward Fe was similar. Inhibitors investigated were Na acetate, benzoate, silicate, carbonate, tungstate, molybdate, chromate, nitrite, hydroxide, and phosphate. Experiments were carried out to ascertain whether inhibitors that were extremely effective in distilled water were effective in solutions containing KCl. Effect of CO_2 on the corrosion rate was also determined. 20 ref. (R10, Fe)

195-R. Amount of Oxygen on the Surface of Passive Stainless Steel. Herbert H. Uhlig and Samuel S. Lord, Jr. *Electrochemical Society, Journal,* v. 100, May 1953, p. 216-221.

Amount of O_2 on the surface of 18-8 stainless steel was obtained by pickling the alloy with HCl-H_2SO_4, washing with N_2-saturated water, and then exposing the metal to water of known dissolved O_2 content. Tables and graphs. 21 ref. (R10, SS)

196-R. Corrosion of Fuel-Injection Nozzles. W. P. Mansfield. *Engineering,* v. 175, May 1, 1953, p. 564-566.

Investigation of the cause of corrosion. Shows that it could be eliminated by a suitable increase in nozzle temperature. Photographs. (R7)

197-R. The Effect of Water Properties. *Gas Times,* v. 75, May 1, 1953, p. 147-148, 150, 153.

Extracts from "Water Properties and Their Effect Upon Some Water Heating Appliances" by Philip Lang. Effect of softening, synthetic detergents, scale reducers, corrosion, and electrolytic inhibitors. (R4)

198-R. Corrosion Resistance of Titanium, Zirconium, and Stainless Steel in Organic Compounds. I. R. Lane, Jr., L. B. Golden, and W. L. Acherman. *Industrial and Engineering Chemistry,* v. 45, May 1953, p. 1067-1070.

Results obtained with Ti, Zr, and stainless steel exposed to the corrosive action of various anhydrous and aqueous solutions of organic compounds at several temperatures. Tables. 12 ref. (R5, Ti, Zr, SS)

199-R. Evaluation of Bearing Packages. Wells E. Ellis, O. L. Maag, and M. J. Benach. *Modern Packaging,* v. 26, May 1953, p. 127-132, 190, 193.

Data from outdoor storage tests and laboratory accelerated tests of polyethylene containers, plastic strippable compounds, and rigid metal containers of the food-can type. Photographs, tables. (R3, T10)

200-R. Value of Test Coupons in Cathodic Protection. Marshall E. Parker. *Oil and Gas Journal,* v. 52, May 11, 1953, p. 126-127.

Use of coupons can determine if full protection is being afforded at a certain point on a structure and can show what the current density is at a given location. (R10)

201-R. Cathodic-Protection Monitor. Marshall E. Parker. *Oil and Gas Journal,* v. 52, May 11, 1953, p. 143.

Emphasizes need for inspecting a cathodic protection system after it has been installed. (R10)

202-R. Paint Industry Forum. "How to Inhibit Corrosion". Robert S. Mercer, George E. Niedt, Ken Keating and John J. Oates, *Paint Industry Magazine,* v. 68, Apr. 1953, p. 16-17.

Presents views of representatives from three indsutries. Minimum requirements for an outdoor metal protective paint. (R26)

203-R. Cathodic Protection Parasites. Marshall E. Parker. *Petroleum Engineer.* v. 25, May 1953, p. D22-D26.

Effect of structures and accessories associated with the pipeline itself. (R10, CN)

204-R. Improvement in Tank Bottom Protection. Hans Schmoldt. *Pe-*

troleum Engineer. v. 25, May 1953, p. D29-D30, D32, D34.

New development to protect crude oil storage tanks from corrosion. Photographs. (R10, CN)

205-R. Cathodic Protection at Compressor Stations. J. C. Berringer. *Petroleum Engineer,* v. 25, May 1953, p. D99-D100.

Installation and advantages offered. (R10, CN)

206-R. Corrosion. G. T. Colegate. *Petroleum Technology, Reviews,* v. 12, 1952, p. 420-432.

Cathodic protection, coating of pipelines, well corrosion, and refinery corrosion. 52 ref. (R7, R10)

207-R. Paint and Corrosion Committees Help Dow Chemical Fight Corrosion. *Plant,* v. 7, May 1953, p. 47-49.

Discusses work of committees who test various materials; make regular surveys of the plant; set up manuals and specifications; and act as clearing houses for the interchange of data on painting and corrosion. Photographs. (R26)

208-R. (German.) **V_2O_5 Corrosion of Scale Resistant Materials and Their Influence on Individual Alloying Elements.** E. Fitzer and J. Schwab. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 1, Jan. 1953, p. 1-7.

Investigation of accelerated oxidation in scale resistant alloys shows attack is due to scaling by V_2O_5. Test for resistance to O_2 plus V_2O_5 attack is described. Photographs, graphs, tables. 11 ref. (R2, Cu, Fe, Ni, SS)

209-R. The Logarithmic Growth Law for the Oxidation of Titanium. J. T. Waber, G. E. Sturdy, and E. N. Wise. *American Chemical Society, Journal,* v. 75, May 5, 1953, p. 2269-2270.

Study to determine whether the break in the Arrhenius plot of Gulbransen and Andrew's data is due to change in rate law. (R2, Ti)

210-R. (English.) **Light and Medium-Duty Contact Materials.** J. C. Chaston. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 44-48.

Ways in which thermally unstable surface films of oxides or sulphides may influence contact behavior. (R2, T1, Ag, Pa, Au, Pt)

211-R. (German.) **Special Demands in Corrosion Testing of Lubricants.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 1, Jan. 1953, p. 22-31.

Tests on the corrosive effects of lubricants on various metals. (R11)

212-R. (German.) **Specification Issue DIN 50.908 on Testing of Light Metals, Stress-Corrosion Tests.** K. Matthaes. *Werkstoffe und Korrosion,* v. 4, no. 2, Feb. 1952, p. 58-66.

Presents test results in which tension is recorded logarithmically against the life of the sample. (R11, R1, Al)

213-R. (German.) **"Sweating" of Paper and Its Effect on Enclosed Iron Goods.** Gerhard Schikorr. *Werkstoffe und Korrosion,* v. 4, no. 3, Mar. 1953. p. 81-86.

Series of tests for studying formation of "sweat" under varying conditions. (R5, Fe)

214-R. (German.) **Mechanism of Dissolving Metal in HNO_3 With Formation of NO_2 and NO.** E. Abel. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 76-80.

Theoretical discussion of equilibria involved. (R5)

215-R. (German.) **Metallography of Light Metals. Part VI. Corrosive Attack of Pure Aluminum.** Hans Kostron, Elfriede Höffler, and Werner Sautter. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 17-21.

Surfaces which resemble pellets were exposed to the attack of HCl and HNO_3 mixture. (R5, Al)

216-R. (German.) **Kinetics of Wustite Formation During Oxidation of Iron.** Karl Hauffe and Harold Pfeiffer. *Zeitschrift für Metallkunde,* v. 44, no. 1, Jan. 1953, p. 27-36.

Unusual linear character of conversion-time curve during formation of dense covering layers was observed. Describes dependence of velocity constant for FeO and concentrations of nonconformities in gas mixture composition and temperature. Graphs, tables. (R2, Fe)

217-R. (German.) **Practical and Basic Information on Corrosion in a Chemical Plant.** Max Werner. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 37-43.

Special cases and control measures. Diagrams. (R general, Ag, Cu, Ni, Al, Mg)

218-R. A Case History of Corrosion. Carl R. Davis. *American Gas Association Monthly,* v. 35, May 1953, p. 23-25.

A 16-yr. cathodic protection program. Diagrams. (R10)

219-R. New Field for High Vacuums. *Chemical Engineering,* v. 60, June 1953, p. 134, 136-137.

Use of high-vacuum concentration in heavy chemical and pulp process

because low temperatures cut down corrosion and limit scaling. (R general)

220-R. Boiler-Water Treatment to Prevent Corrosion. U. R. Evans. *Engineering,* v. 175, May 8, 1953, p. 602-604.

Survey of boiler problems from the standpoint of fundamental corrosion science. (R4)

221-R. The Influence of Certain Smokes and Dusts on the SO_3 Content of the Flue Gases in Power-Station Boilers. P. F. Corbett and D. Flint. *Institute of Fuel, Journal,* v. 25, May 1953, p. 410-417, 446.

Object of tests was to minimize fouling and corrosion of external heat-exchange surfaces by SO_3 in the flue gases. Tables, graphs. 23 ref. (R9)

222-R. Scaling Characteristics Make or Break a High-Temperature Metal. D. D. Cubicciotti. *Iron Age,* v. 171, May 21, 1953, p. 144-146.

Linear, parabolic, and logarithmic oxidation curves show that parabolic oxidation produces protective coatings. SiO_2 forms a glass which is the best type of protective coating. (R2, SG-h)

223-R. Tests of the Protective Value of Metallic Coatings Under Sheltered Conditions (Marine Atmosphere). S. G. Clarke and W. N. Bradshaw. *Journal of Applied Chemistry,* v. 3, Apr. 1953, p. 147-154.

Results of tests on the corrosion of a range of coatings on steel (electroplated Zn, Cd, Sn, Pb, Ag, Pb-Sn, Sn-Zn, and sprayed Al) and of Ag coatings on Al are presented. Tests were carried out with special reference to the behavior of parts to be used or stored inside unsealed boxes, lockers or cabinets in a marine environment. Photographs, tables. (R3, Zn, Cd, Sn, Pb, Ag, Al, ST)

224-R. Simplified Low-Speed Rotor Techniques for Corrosion Testing. F. Wormwell. *Journal of Applied Chemistry,* v. 3, Apr. 1953, p. 164-169.

Several simplified rotor techniques are described. Corrosion is determined by measurement of weight loss or depth of pitting on specimens in round-rod or sheet form. Results help explain influence of cathodic and anodic polarization on the corrosion of mild steel in sea water. (R11, CN)

225-R. The Effect of Impurities in the Metal on the Rate of Corrosion of Zinc and Galvanized Coatings in the Atmosphere. P. T. Gilbert. *Journal of Applied Chemistry,* v. 3, Apr. 1953, p. 174-181.

Results of atmospheric exposure tests under effect of additions to the galvanizing bath on the corrosion resistance of hot dipped coatings, and behavior of rolled Zn sheets of differing purity. Tables, graphs. (R3, Zn)

226-R. Methods Used in the Literature for Presenting or Summarizing Corrosion Data. Mars G. Fontana. *Ohio State University Engineering Station News,* v. 25, Apr. 1953, p. 33-35.

Modification of the Shell idea to measure corrosion rate. Graphs. (R11)

227-R. Is Your Plant Corroding? E. W. Wallace. *Oil and Gas Journal,* v. 52, May 25, 1953, p. 201-202, 204, 206, 209.

Typical field experience with gas plant equipment and accessories. Emphasizes that corrosion is not limited to wells alone. (R general)

228-R. Corrosion for Pipeliners. III. Cathodic Protection. Starr Thayer. *Pipe Line News,* v. 25, May 1953, p. 31-32, 34, 36, 38.

Practical application of cathodic protection, sacrificial anodes, rectifiers, preliminary tests, ground beds, and interference. (R10, CN)

229-R. Corrosion in the Pulp and Paper Industry. F. A. Guba. *Tappi,* v. 36, May 1953, p. 134A-137A.

Corrosion with respect to alloys available (Cr-Ni-Fe) and types of corrosion. Tables. (R7, T29, AY)

230-R. Experiences With Field-Applied Inconel Digester Linings. S. J. Baisch. *Tappi,* v. 36, May 1953, p. 221-225.

Experimental attempt was made to solve digester corrosion by field lining a digester with ⅛-in. thick Inconel strip. Results of the experiments. Photographs, diagrams. (R7, Ni)

231-R. Fundamentals of Corrosion and Its Mitigation. E. W. Moore, W. H. Sears, and L. Rubin. *Water & Sewage Works,* v. 100, May 1953, p. R102-R106.

Defines corrosion and describes fundamental reactions and methods of mitigation. (R general)

232-R. (French.) **Corrosion Information Center. Shell V.P.I. Treated Paper as a New Corrosion Resisting Packaging Material.** *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 88-90.

Properties and use of Shell vapor phase inhibitor (V.P.I.). Table. (R10)

233-R. (German.) **Durability of Al Roofs and Gutters After 20 Years'**

Service. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 37.

Al roofs, gutters, and rainpipes put up 21 years ago showed excellent resistance to severe weathering conditions. Photographs. (R3, Al)

234-R. (German.) **Polarization and Passivation in Metallic Corrosion.** W. Katz. *Metall,* v. 7, no. 5-6, Mar. 1953, p. 161-170.

Nernst formulas were applied to various metals and corrosive media. Graphs. 12 ref.
(R10, R11, Ag, Cd, Zn, Sn, Ni, CN)

235-R. (German.) **On the Passivity of Iron.** Karl Friedrich Bonhoeffer. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 77-81.

Modern passivation and activation phenomena of Fe in acid solution. Graphs, diagrams. 22 ref. (R10, Fe)

236-R. (German.) **Passivity of Iron.** T. G. Owe Berg. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 82-83.

Conclusions resulting from measurements of solubility velocities and potentials of Cu and Fe in HNO_3 at various concentrations. Graphs, diagrams. 6 ref. (R10, Fe, Cu)

237-R. (German.) **Stress Corrosion of Aluminum Alloys.** Paul Brenner. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 85-97.

Lists four measures for elimination of corrosion sensitivity of Al alloys. Photographs, graphs, diagrams. 59 ref. (R1, Al)

238-R. (Russian.) **Corrosion Resistance and Weldability of EZh-1 Steel.** E. D. Surovtseva, N. V. Suknobokova, and E. M. Lapitskaia. *Avtogennoe Delo,* v. 23, no. 9, Sept. 1952, p. 8-12.

Investigation of EZh-1 steel (0.08-0.06% C, 0.46-0.21% Mn, 0.03-0.20% Si, 12.61-11.93% Cr, 0.23-0.17% Ni, 0.020-0.015% S, 0.026-0.025% P). Data are tabulated. Micrographs, photographs. (R general, K9, SS)

239-R. (Book.) Marine Fouling and Its Prevention. Woods Hole Oceanographic Institution. 388 p. 1952. U. S. Naval Institute, Annapolis, Md.

Problems, biology, and prevention of fouling. In some cases the aim is to meet requirements of specialists by reviewing technical details; in others the intent is to inform specialists about pertinent matters with which they may not be familiar. (R4)

240-R. (Book—Russian.) **Corrosion of Chemical Apparatus and Corrosion-Resistant Materials.** I. Ya. Klinov. 291 p. 1950. Governmental Scientific-Technical Publishing House, Moscow, U.S.S.R.

Information on high-alloy steels and irons being produced in Russia. Russian "marks" are tabulated to illustrate discussion of materials which resist corrosion at both high and low temperatures.
(R general, SG-g)

241-R. Corrosion of Heating Electrodes in Molten Chloride Baths. H. R. Copson. *Electrochemical Society, Journal,* v. 100, June 1953, p. 257-264.

Methods of preventing "pencilling" involving the use of rectifiers, oxidizing agents, and low current density. Graphs, photographs. 4 ref. (R6, Ni, Cr)

242-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, June 1953, p. 91A-92A, 94A.

Reviews "Corrosion by Acids at High Temperatures" by R. F. Miller, R. S. Treseder, and A. Wachter; and "Corrosion by Aqueous Solutions at Elevated Temperatures and Pressures" by F. H. Beck and M. G. Fontana. Discusses handling HNO_3 at temperatures above atmospheric boiling point. Effect on stainless steel and Cu. (R5, Cu, SS)

243-R. Corrosion Prevention by Paints. J. E. O. Mayne. *Institute of Metal Finishing, Bulletin,* v. 3, Spring 1953, p. 19-28.

Mechanism by which paint films prevent corrosion of iron and steel. 19 ref. (R10, L26, ST, CI)

244-R. The Elements of Cathodic Protection. K. A. Spencer. *Institute of Petroleum Review,* v. 7, May 1953, p. 149-154.

Causes of corrosion, principle of cathodic protection, equipment, and economy. Diagrams. (R10)

245-R. Corrosion and Its Control. Fred R. Mulker. *Journal of Petroleum Technology,* v. 5, sec. 1, May 1953, p. 30.

Process and ways of combating corrosion. (R general, Ni, SS)

246-R. How to Control Marine Corrosion With Galvanic Anodes. R. D. Taylor. *Marine Engineering,* v. 58, June 1953, p. 69-73.

How Mg anodes can be used effectively to control corrosion. Photographs. (R3, R10, Mg)

247-R. Little Bugs. Big Problems. O. B. Williams. *World Oil,* v. 136, June 1953, p. 170, 172, 175.

Problem of controlling sulfate-reducing bacteria in oil field waters. (R1, CN)

248-R. Some Answers to Oil Field Scale and Corrosion. E. N. Frisius.

World Oil, v. 136, June 1953, p. 191-192, 194.

Occurrence of scale and corrosion; suggests solutions. (R2, R10)

249-R. (German.) **Corrosion of Aluminum Ware.** Paul Melchoir. *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 83-84.

Formation of small black grooves is not due to impurities of Al but to carbonized carbohydrates. Mechanical cleaning is best protection against pitting. Photographs. (R2, L10, Al)

250-R. The Cavitation-Erosion of Ships' Propellers. J. Balhan. *Engineers' Digest,* v. 14, May 1953, p. 163-167, 170.

Translated and condensed from *Ingenieur,* v. 65, no. 6 and 7, Feb. 6 and 13, 1953, p. W29-W40, W41-W45, W52. Three types of cavitation; theoretical considerations. Diagrams. (R2, Cu, CN)

251-R. The Action of Nitric Acid on Metals. Mahadeo M. Tillu. *Journal of Chemical Education,* v. 30, June 1953, p. 290.

Single general equation for these reactions. (R5)

252-R. High Temperature Corrosion in Nickel-Chromium Alloys. Norman Spooner, John M. Thomas, and L. Thomassen. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 844.

Investigation of Ni-Cr and Ni-Cr-Fe when used as electrical resistance heating elements in reducing atmospheres. (R1, Ni, Cr)

253-R. New Corrosion Problems Created by High Temperatures and Chemical Processes. John Parina, Jr. *Metal Progress,* v. 63, May 1953, p. 112-114.

Reviews papers presented at the Ninth Annual Conference of the National Association of Corrosion Engineers. Corrosion problems associated with high-temperatures, passive state of Ti and refinery processes. (R general, Ti, SS)

254-R. "Crusader" Checked for Corrosion. *Railway Age,* v. 134, June 22, 1953, p. 17-18.

Corrosion of stainless steel, carbon steel, and Al in railroad cars. (R3, Al, SS, CN)

255-R. (German.) **Basic Principles of Corrosion.** E. Lange. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 18, no. 12, Dec. 1952, p. 395-404.

Basic principles, various electrochemical aspects, and energy of a simple corrosion system. (R1)

256-R. (German.) **Corrosion Problems in Fire Engineering.** Ludwig Scheichl. *Werkstoffe und Korrosion,* v. 4, no. 4, Apr. 1953, p. 123-128.

Fire-fighting equipment and appliances and corrosive actions to which they may be subjected. Some anticorrosion measures are suggested. Diagrams. 16 ref. (R general)

257-R. Corrosion Research. W. H. J. Vernon. *Chemical Age,* v. 68, June 6, 1953, p. 853-854.

British research. (R general)

258-R. Corrosion Inhibitors in Neutral Aqueous Solutions. F. Wormwell. *Chemistry & Industry,* June 6, 1953, p. 556-560.

Investigations demonstrated the value of Na benzoate and Na salts of other organic acids as corrosion inhibitors for mild steel. Tables. 47 ref. (R10, CN)

259-R. Bacterial Corrosion of Offshore Structures. J. A. Caldwell and M. L. Lytle. *Corrosion* (Technical Section), v. 9, June 1953, p. 192-196.

Investigation to determine whether it is probable that corrosion of steel occurs at or below the mud line; causes of corrosion, and reducing such corrosion to a reasonable minimum. (R1, ST)

260-R. Studies on the Inhibition by Amines of the Corrosion of Iron by Solutions of High Acidity. C. C. Nathan. *Corrosion* (Technical Section), v. 9, June 1953, p. 199-202.

Studies on the corrosion of steel strips and Fe powder in solutions of 1 N HCl. Studies were directed toward evaluation of various aliphatic and aromatic amines as corrosion inhibitors and to the correlation of the structure of the amines with their adsorption characteristics and inhibitor efficiencies. Graphs. (R10, Fe, ST)

261-R. Graphical Multiple Correlation of Corrosion Data. O. B. Ellis. *Corrosion* (Technical Section), v. 9, June 1953, p. 203-208.

Graphical method for a multiple correlation analysis involving several variables. Weight loss data from atmospheric exposure of low-alloy steels. Method is described and the effect of concentration of Ni, Mn, P, and Si on weight loss is shown. Graphs. (R3, S12, AY)

262-R. How Montana Power Uses Cathodic Protection for 95 Per Cent of Distribution Mains. Carl R. Davis. *Gas Age,* v. 111, June 4, 1953, p. 32-34, 73-74.

Experiences since 1936. Diagrams. (R10)

263-R. Nickel-Clad Molybdenum. J. Lomas. *Machinery* (London), v. 82, May 22, 1953, p. 965.

Shows that up to 1100° C. clad Mo sheets give superior all-round service to unclad Mo, combining high strength with resistance to oxidation. Edge protection for work at high temperatures offers no difficulty. Mechanical properties. (R2, L22, Q general, Mo, Ni)

264-R. Sensitive Corrosion Measurements With an Interferometer. *National Bureau of Standards, Technical News Bulletin,* v. 37, June 1953, p. 88-90.

Interferometer procedure used for studies of the corrosion resistance of such materials as optical glass, porcelain enamel, quartz and other natural and artificial silicates, and various metals. (R11)

265-R. Stray-Current Corrosion. *Oil and Gas Journal,* v. 52, June 15, 1953, p. 151.

Typical example of stray currents and resulting corrosion. (R1)

266-R. South Louisiana Operators Wage Fight on Four Types of Corrosion. Jack T. Martin. *Oil and Gas Journal,* v. 52, June 22, 1953, p. 308-314, 316, 318, 320.

Water independent, water dependent, H_2S, and galvanic corrosion. Tables. (R general)

267-R. Corrosion Problems, New Processes Mark Refiners' Meet. Arch L. Foster. *Petroleum Engineer,* v. 25, June 1953, p. C39-C42.

"Autofiner" process, economics of "Houdriforming," TCP process, corrosion inhibitor, and H_2 attack on steel. (R general, ST)

268-R. In Corrosion Testing Get the Facts. Allen G. Gray. *Steel,* v. 132, June 15, 1953, p. 128, 130-131, 133.

Important variables and typical results for Ni alloys. (R11, Ni)

269-R. Corrosion Resistance of Titanium and Its Alloys. F. L. LaQue. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6. 1951. p. 55-68; P.B. Report No. 111,083. U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Resistance of Ti to many environments. Tables, graphs, photographs. 24 ref. (R general, Ti)

270-R. The Corrosion Resistance of Zirconium and Its Alloys. Lex B. Golden. Paper from Zirconium and Zirconium Alloys, p. 305-326. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Results obtained with Zr exposed to the corrosive action of various concentrations of inorganic acids and salts, and organic acids. Relative corrosion resistance of arc-melted and induction-melted Zr and Zr alloys. Photographs, tables. 18 ref. (R general, Zr)

271-R. (French.) General Outline on the Electrochemical Behavior of Metals. I. Marcel Pourbaix. *Ossature Metallique,* v. 18, Jan. 1953, p. 47-56.

Corrosion phenomena in the presence of H_2O and aqueous solutions. Part I emphasizes influence of pH, electrochemical equilibria, and electrode voltage. Tables, charts. (To be continued.) (R1, Ag, Cu, Al)

272-R. (French.) The Phenomena of Passivation of Aluminum Immersed in a Nitric Medium. Jos. Patrie. *Revue de l'Aluminium,* v. 29, Dec. 1952, p. 431-437; v. 30, Jan. 1953, p. 5-11; v. 30, Feb. 1953, p. 45-54.

Part I: Passivation of Al immersed in acidic oxidizing solutions frequently involves complex reactions which are difficult to identify. A theoretical Al-H_2O diagram taking into account pH and potential coordinates is presented. Part II: Use of noninsulated Al and galvanic oxidation process in concentrated HNO_3. Part III: Galvanic oxidation of Al in HNO_3 and H_2CrO_4. Oxidation time, current density, temperature, and nature of the electrolyte are included. (To be continued.) (R10, Al)

273-R. (German.) Behavior of Aluminum Toward Hydrofluoric Acid, Phosphoric Acid, Chromic Acid, and Their Mixtures. W. Wiederholt. *Metall,* v. 7, nos. 9-10, May 1953, p. 343-347.

Points out absence of layer formation and conditions that lead to such formation. Graphs, tables. 3 ref. (R5, Al)

274-R. (German.) Stress Cracks Produced in Steel by Molten Zinc. Wilhelm Rädeker. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 654-658.

Deteriorating effect of molten metals on structure and properties of steel. Behavior of various steel grades are emphasized. Photographs, graphs, tables. 3 ref. (R6, Q general, Zn, ST)

275-R. (German.) Attack of Iron by Iron-Saturated Zinc Melts. Dietrich Horstmann. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 659-665.

Relationship of temperature and time of attack of Zn on Fe. This was done by determining Fe loss and growth of Fe-Zn alloy layers caused by dipping Fe in molten Zn. Photographs, graphs, diagrams, tables. 17 ref. (R6, Fe, Zn)

276-R. (German.) The Corrosion Resistance of Fusion Welding on Steels. Ernst Klosse. *Werkstoffe und Korro-*

sion, v. 4, no. 5, May 1953, p. 172-178.
Small test specimens give no satisfactory results since corrosion resistance depends on material, welding technique, design of the weld joint, mechanical stress, and corrosive agent. Diagrams, photographs, photomicrographs. 19 ref.
(R11, K general, ST)

277-R. (German.) Use of Al in Hot-Spraying Process. Harribald Sprenger. *Zeitschrift für Metallkunde*, v. 44, no. 5, May 1953, p. 219-223.
Corrosion resistant properties. Tables, photographs. 8 ref.
(R general, L23, Al)

278-R. Extending Hot Water Tank Life. R L. Horst. *American Gas Association Monthly*, v. 35, June 1953, p. 10-11, 50.
Effectiveness of cathodic protection of domestic hot water heaters is evaluated in a series of tests. Graphs. (R10, CN)

279-R. A Study on Causes of Surface Damages on Ship Propellers. Engel Galtung. *American Society of Naval Engineers, Inc., Journal*, v. 65, May 1953, p. 389-399.
Damage due to contact with water. 16 ref. (R4)

280-R. Deaeration of Feed Tanks Will Minimize Boiler Tube Corrosion. *Bureau of Ships Journal*, v. 2, July 1953, p. 39-40.
Stresses the importance of operating deaerating feed tanks at proper pressures and temperatures.
(R4)

281-R. Corrosion. Its Cause and Control. W. R. Thomas. *Canadian Metals*, v. 16, June 1953, p. 21-22.
Nature of corrosion processes and fundamental general principles of control. (R1)

282-R. Stainless Steels. *Chemical Engineering*, v. 60, Apr. 1953, p. 290, 292, 294, 296-298, 300; May 1953, p. 300, 302, 304-306, 308, 310, 312; June 1953, p. 302, 304, 306, 308, 310-311; July 1953, p. 262, 264, 266, 268, 270, 272.
Factors in selection of stainless steel such as operating conditions, design, and fabrication requirements. Corrosion resistance of 18-8, Mo, and 12% Cr stainless steels to a number of corrosives. Mechanical and chemical properties and applications. Tables, graphs.
(R general, Q general, T29, SS)

283-R. Inhibition of Corrosion. U. R. Evans. *Chemistry & Industry*, May 30, 1953, p. 530-533.
Dry and wet oxidation; and use of oxidizing anodic, cathodic, and organic inhibitors. (R10)

284-R. Caustic Cracking in Steam Boilers. R. Rath. *Chemistry & Industry*, June 20, 1953, p. 600-603.
Use of alkaline phosphates for the protection of boiler metal in certain cases of stress corrosion. Tables.
(R10, ST)

285-R. Nickel Coating Technique Minimizes Tubing Corrosion. S. S. Wilson. *Drilling*, v. 14, June 1953, p. 92, 94.
Advantages of Ni-lined pipe in combating corrosion in oil fields.
(R general, L general, Ni, CN)

286-R. Oxidation of Metals at High Temperatures. Walter J. Moore. *Electrochemical Society, Journal*, v. 100, July 1953, p. 302-313.
Available data on the oxidation rates of pure metals from 300 to 1000° C. were analyzed in terms of concentrations of defects in the oxide structures and defect diffusion coefficients. Quantitative agreement with diffusion theory is obtained in the cases of p-type oxides such as Cu_2O and NiO, in which cationic vacancies arise by solution of O_2 at the oxide-oxygen interface. 61 ref.
(R2, Cu, Ni)

287-R. Cathodic Protection of Steel Gas Mains. H. M. Powell. *Gas Journal*, v. 274, June 24, 1953, p. 853.
Nature and advantages of cathodic protection. (R10, CN, Mg)

288-R. Flow of Oxide Layer During Oxidation of Copper. Walter J. Moore. *Journal of Chemical Physics*, v. 21, June 1953, p. 1117.
Further data on oxidation of Cu.
(R2, Cu)

289-R. Work in Great Britain on Corrosion and Deposits in Air Preheaters. A. A. Berk. *Mechanical Engineering*, v. 75, July 1953, p. 545-546.
Laboratory findings; applications of dew-point meter and dusting methods; immunity period in new boilers; and cleaning air preheaters and superheaters. (R4)

290-R. Coal Gas and Aluminium. *Metallurgia*, v. 47, no. 283, May 1953, p. 246.
Installation of an Al roof to determine suitability of Al as a structural material in gas works. Roof was tested for effects of corrosion after four years. (R9, T26, Al)

291-R. A New Concept of Heat-Checking on Brass Pressure-Casting Dies. W. R. Brown. *Metal Progress*, v. 63, June 1953, p. 73-78.
Experiments show that cause of cracking is formation of a hard and brittle intermediate layer resulting from intermetallic corrosion of the die steel by the zinc in the brass. Micrographs. (R1, Q26, Cu)

292-R. Bacteriological Control. *Oil and Gas Journal*, v. 52, June 29, 1953, p. 113.

Occurrence and control of bacterial corrosion. (R1)

293-R. War Against Corrosion. Preventing Hydrogen Attack on Steel. W. A. Bonner, H. D. Burnham, J. J. Conradi, and T. Skei. *Petroleum Processing*, v. 8, May 1953, p. 686-690; June 1953, p. 878-883.

Conditions necessary for attack to occur and practical methods for operators to detect H_2 penetration. New techniques for prevention by use of ammonium polysulfide and O_2 as inhibitors. Graphs. 14 ref. (R10, CN)

294-R. Reduce Corrosion Costs With Organic Inhibitors. C. C. Hulbert and J. A. Rippetoe, Jr. *Petroleum Refiner*, v. 32, June 1953, p. 113-118.

How to minimize maintenance in tower tops and overhead systems. Tables. (R10)

295-R. Economic Factors of Atmospheric Corrosion Versus Protection. Clarence C. Harvey. *Petroleum Refiner*, v. 32, June 1953, p. 122-124.

Economic aspects of painting programs. (R3, L26)

296-R. Corrosion for Pipeliners. IV. Testing. Starr Thaver. *Pipe Line News*, v. 25, June 1953, p. 34-37.

Methods of measuring the potential difference between protected metal and surrounding soil. (R8)

297-R. Coatings Cut Corrosion Costs. L. G. Jones. *Power Engineering*, v. 57, July 1953, p. 87-89.

Proper selection of corrosion resistant metals and metallic coatings. Tables. 4 ref.
(R general, L general, CI, Cu, Al, Zn, Pb)

298-R. Corrosion Problems in Railway Equipment. Factors in Hopper Car Design on Virginian. L. W. Doggett. *Railway Locomotives and Cars*, v. 127, July 1953, p. 55-57.

Tests on hopper-car plates made of "Cor-Ten". (R general, T23, AY)

299-R. Certain Aspects of the Galvanic Corrosion Behavior of Titanium. David Schlain. U. S. Bureau of Mines, Report of Investigations 4965, Apr. 1953, 21 p.

Results of various tests. Tables, graphs. (R1, R11, Ti)

300-R. Packaging of Wire and Wire Products. A. H. Andrews. *Wire and Wire Products*, v. 28, June 1953, p. 572, 574-575, 628-629.

Developments in packaging techniques to prevent rusting and damage. (R10)

301-R. (English.) **The Anodic Behaviour of Iron-Chromium Alloys in Sulphuric Acid Solution.** Susumu Morioka and Kazutaka Sakiyama. *Technology Reports of the Tohoku University*, v. 17, no. 2, 1953, p. 176-189.

Corrosion resistance, anodic dissolution and electropolishing of Fe-Cr alloy. Diagrams, graphs. 4 ref. (R1, L13, Fe, Cr)

302-R. (German.) **Theory of Scaling Processes on Metal Alloys.** Karl Hauffe. *Archiv für das Eisenhüttenwesen*, v. 24, no. 3-4, Mar.-Apr. 1953, p. 161-171.

Shows how formation of metal oxides, sulfides, or halides may be a diffusion phenomena. Suggestions for developing scale-resistant alloys. Graphs, diagrams. 97 ref. (R2, Ni)

303-R. (German.) **Improvement of Testing of Steel for Sensitivity to Stress-Corrosion.** Wilhelm Radeker. *Stahl und Eisen*, v. 73, no. 8, Apr. 8, 1953 p. 485-492.

Improved test using a long-duration hot tensile test in a $Ca(NO_3)_2$—NH_4NO_3 bath. Charts, photographs. 10 ref. (R1, ST)

304-R. Air-Preheater Design as Affected by Fuel Characteristics. Hilmer Karlsson and W. E. Hammond. *American Society of Mechanical Engineers, Transactions*, v. 75, July 1953, p. 711-718; disc., p. 718-722.

Equipment design to prevent corrosion and plugging. Graphs, diagrams. (R7)

305-R. Contamination of Condensate by Heat-Exchanger-Tube Alloys. J. D. Ristroph and E. B. Powell. *American Society of Mechanical Engineers, Transactions*, v. 75, July 1953, p. 729-738; disc., p. 738-745.

Results from condensate contamination studies conducted at two steam power stations. Evaluates influence of temperature of condensate, dissolved gas content, and cumulative service time on degree of metallic contamination caused by 12 alloys used in heat exchangers. Test procedures. Photographs, diagrams, tables. (R4, Cu, Ni, SS)

306-R. The Relative Effect of Traces of Hydrogen Sulfide and Sulphur Dioxide on the Corrosion of Copper. Joseph Byrne, M. D. Kahn, H. B. Kristinsson, and C. O. Maddox, Jr. *Blast Furnace and Steel Plant*, v. 41, July 1953, p. 780-781.

Experimental results indicate that traces of H_2S are highly corrosive. 4 ref. (R6, Cu)

307-R. Condensed Phosphates in the Treatment of Corrosive Waters. D. N. Parham and C. W. Tod. *Chemistry & Industry*, June 27, 1953, p. 628-631.

Chemistry of the phosphates. Use in prevention of corrosion in cold waters containing high concentrations of chloride. (R4, R5, CN)

308-R. Amines for Corrosion Prevention in Steam Condensate Systems. C. Jacklin. *Corrosion* (News Section), v. 9, July 1953, p. 1.

Advantages of morpholine. Photograph. (R4)

309-R. Examination of 335 Miles of Asphalt Mastic Coated Pipe. Donald E. Miltner. *Corrosion* (Technical Section), v. 9, July 1953, p. 210-214; disc., p. 214-215.

Methods of test employed in examination. Test results, typical coating failures found, and coating behavior with particular reference to the prolonged effect of cathodic protection. Photographs. (R10, R8)

310-R. Cathodic Protection Applied to Tank Bottoms. Scott P. Ewing and J. S. Hutchison. *Corrosion* (Technical Section), v. 9, July 1953, p. 221-231; disc., p. 231.

Laboratory studies in which method was devised for determining cathodic current requirements for protection of storage tank bottoms. Photographs, tables, graphs. 8 ref. (R10, CN)

311-R. Effects of Polarization on Telephone Cable Buried Through a Salt Bed. Daniel R. Werner. *Corrosion* (Technical Section), v. 9, July 1953, p. 232-236.

Method of cathodic protection. Diagrams, graphs. (R10, Cu, Pb, Mg)

312-R. Effect of Composition of Steel on the Performance of Organic Coatings in Atmospheric Exposure. F. L. LaQue and James A. Boylan. *Corrosion* (Technical Section), v. 9, July 1953, p. 237-241.

Common automobile paint system. Tables, photographs. (R3, Cu, AY, CI)

313-R. Cosmetic Aerosols. R. C. Downing and E. G. Young. *Drug & Cosmetic Industry,* v. 73, July 1953, p. 32-33, 106-112.

Markets, compatibility, pressure, spray character, and corrosion. Photographs, tables. (R7, Al, Cu, ST)

314-R. Corrosion-Free Vacuum Filtration. Walter Perkins and R. O. Weiss. *Drug & Cosmetic Industry,* v. 73, July 1953, p. 44-45, 129-133.

Proper selection of filters for specific purposes. Photographs, tables. 5 ref. (R general, T29)

315-R. Detecting Internal Corrosion by Ultrasonic Inspection. I. Improved Equipment Has Made Gauge Applicable for Pipeline Work. Donald C. Erdman. *Gas,* v. 29, July 1953, p. 104, 106.

Photographs. (R11, S14, CN)

316-R. New High Temperature and Corrosion Research Projects Planned by the Alloy Casting Institute. *Industrial Heating,* v. 20, July 1953, p. 1384, 1386, 1388, 1390.

Projects planned, including efficiency at higher temperatures, alloy conservation, and high-strength corrosion resistant alloys. (R general, SG-g, h)

317-R. Hydrogen Blisters in Brass Sheet. R. Eborall and A. J. Swain. *Institute of Metals, Journal,* v. 81, July 1953; p. 497-500.

Causes of blistering and an effective remedy. Tables. (R2, Cu)

318-R. Locating High-Resistance Joints in Underground Piping. Marshall E. Parker. *Oil and Gas Journal,* v. 52, July 20, 1953, p. 141.

Methods for locating joints so that cathodic protection can be effective. (R10)

319-R. Heat-Resistant Furnace Castings. W. L. Nelson. *Oil and Gas Journal,* v. 52, July 20, 1953, p. 143.

Classifies stainless steel castings according to their resistance to oxidizing atmospheres, presence of S, and reducing atmospheres. Tables. (R3, SS)

320-R. Estimating the Corrosivity of Crude Oils. H. A. Cataldi, R. J. Askevold, and A. E. Harnsberger. *Petroleum Refiner,* v. 32, July 1953, p. 145-150.

Studies to find accurate, reliable method for predicting crude oil corrosivity. Tables, graphs. (R7)

321-R. Corrosion for Pipeliners. V. Cathodic Protection Equipment. Starr Thayer. *Pipe Line News,* v. 25, July 1953, p. 40, 42, 44.

Use in production equipment and tools available to the corrosion engineer. (R10, Al, CI)

322-R. Preventing Corrosion of Air Conditioning Equipment. Paul O. Blackmore. *Refrigerating Engineering,* v. 61, July 1953, p. 733-737, 788, 790, 792.

Fundamentals of corrosion and what one company is doing to prevent it. Tables, diagram, photographs. (R3, Fe, Al)

323-R. How to Put the Hex on Corrosion of Car Bodies. *SAE Journal,* v. 61, July 1953, p. 78-80.

Based on "Corrosion of Automobile Bodies" by F. L. LaQue. Corrosive medium, metal that is corroded, and ways to prevent corrosion. (R general, ST)

324-R. An Investigation of "Reticulation" on Aluminium and Light Alloys. J. Herenguel. *Sheet Metal Industries,* v. 30, July 1953, p. 591-596, 598.

Causes, prevention, and cure of minute, interconnected surface

cracks on sheets. Diagrams, photographs. (R2, Al)

325-R. Recovery Operation Corrosion Problems. H. O. Teeple. *Tappi,* v. 36, July 1953, p. 127A-128A.
Corrosion of carbon and stainless steel equipment in paper mills. (R7, CN, SS)

326-R. Corrosion Control Experience in Cedar Rapids, Iowa. Arnold K. Cherry. *Water & Sewage Works,* v. 100, July 1953, p. 253-256.
Improvements in corrosion resistance of pipe lines are credited to higher pH value, phosphate treatment, and flushing program of water treating plant. Photographs. (R10, R4)

327-R. (French.) Behavior of Materials at Temperature of Superheated Steam up to 600° C. G. Bandel and H. J. Wiester. *Métaux Corrosion-Industries,* v. 28, no. 332, Apr. 1953, p. 159-167.
Favorable results with use of heat resistant steels. Tables, diagrams. 9 ref. (R2, SS)

328-R. (Italian.) Application of Electric Models to the Study of Diffusion Phenomena in Differential Aeration Corrosion. Giuseppe Bianchi. *Metallurgia Italiana,* v. 45, no. 4, Apr. 1953, p. 123-127.
Experimental methods used. Results obtained. Graphs, diagrams. 8 ref. (R1, Zn)

329-R. (Russian.) Regulations for the Protection of Underground Metallic Equipment From Corrosion by Stray Currents. B. G. Lortkipanidze. *Elektrichestvo,* no. 9, Sept. 1952, p. 76-79.
Corrections, substitutions, additional ideas, and notes for the revision of a 1940 edition of "Regulations for the Protection of Underground Metallic Equipment From Damage by Stray Currents". 4 ref. (R10)

330-R. (Book.) Temporary Prevention of Corrosion on Metal Surfaces (During Transportation and Storage). B. S. 1133, sec. 6. 98 p. 1953. British Standards Institution, 24 Victoria St., London S.W.1, England. 10s, 6d.
Deals with available methods and establishing performance standards. (R10)

331-R. The Atmospheric Corrosion of Architectural Metals. Hugh P. Godard. *Engineering Journal,* v. 36, July 1953, p. 844-855.
Destruction of metals as related to the atmosphere. Tables, graphs, photographs. 42 ref.
(R3, Al, Cu, Pb, Zn, CN, CI, AY)

332-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, July 1953, p. 91A-92A, 94A.
Chart shows corrosion of "Durimet 20" and "Carpenter 20" in HNO_3 from 50 to 250° F. (R5, SS)

333-R. Growth of Sulphide Films on Copper. T. P. Hoar and A. J. P. Tucker. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 665-679.
Investigation of growth and structure of sulfide films on Cu. Films were produced under simple conditions in liquid media. Tables, diagrams, graphs. 42 ref. (R2, Cu)

334-R. The Oxidation of Copper in the Temperature Range 200°-800° C. R. F. Tylecote. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 681-700.
Changes in weight during oxidation of high-purity Cu sheet were measured over periods up to 100 hr. Effect of different oxidizing atmospheres, such as air, O_2, "oxygen-free" N_2, and air containing water vapor were determined. Other factors were effects of specimen shape, oxide film formed in air before high-temperature oxidation, and recrystallization on the growth of the oxide on work hardened Cu. Graphs, tables. 29 ref. (R2, Cu)

335-R. The Behaviour of Metallic Contacts at Low Voltages in Adverse Environments. Alan Fairweather. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. 1, July 1953, p. 174-182.
Behavior of a closed contact subjected to corrosion and closure processes for a corroded contact, both with and without "wipe". Theoretical basis for design and testing techniques. Diagrams.
(R general, P15, SG-r)

336-R. Microstructural Characteristics of Acid Corrosion in 18% Cr, 8-14% Ni, 3% Mo Steels. H. T. Shirley. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 242-249.
Experimental procedure and results. Tables, micrographs. 10 ref. (R6, SS)

337-R. The Corrosion of Mild Steel Moving Rapidly in Salt Solutions and Natural Waters. F. Wormwell, T. J. Nurse, and H. C. K. Ison. *Journal of Applied Chemistry,* v. 3, June 1953, p. 275-280.
In a high-speed (equivalent to 20 knots) rotor apparatus, electrode potentials can be determined. At 25° C. rate of corrosion is proportional to NaCl concentration up to 0.5*N*; sea water rate is below 0.5*N* NaCl. Graphs, 8 ref. (R4, CN)

338-R. Note on the Protection of Mild Steel by Films of Lanolin. E. G. Stroud and J. E. Rhoades-Brown.

Journal of Applied Chemistry, v. 3, June 1953, p. 287-288.

Results show that a lanolin concentration of 12% or higher in either mineral oil or petroleum spirits is necessary for temporary protection. Lanolin is not completely soluble above 25%. (R10, L26, CN)

339-R. Linear Film Growth in Tarnishing Reactions. R. C. Williams and P. R. Wallace. *Journal of Chemical Physics,* v. 21, July 1953, p. 1294-1295.

The Cabrera-Mott theory satisfies results up to a film thickness of 80 Å. Modifications are required for a more general application. (R2, Ag)

340-R. Marine Exposure Tests on Ti-Al and Zr-Al Couples. *Light Metals,* v. 16, July 1953, p. 223.

Results of preliminary corrosion tests using alloyed Ti and Zr sheets. Photographs. (R3, R4, Ti, Zr, Al)

341-R. Antifreeze Is Never "Permanent". John B. Stobbart. *National Petroleum News,* v. 45, Aug. 5, 1953, p. 81-83.

Corrosion in water pumps due to incorrect use of "permanent" antifreeze. Photograph. (R7)

342-R. What to do About Amine Stress Corrosion. G. L. Garwood. *Oil and Gas Journal,* v. 52, July 27, 1953, p. 334-335, 337-340.

Stress-relieving after welding, and modifications of the gas treating process to reduce corrosive action. Photographs. (R7, J1, CN)

343-R. Ultrasonic Inspection for Internal Pipe-Line Corrosion. S. K. Gally. *Oil and Gas Journal,* v. 52, Aug. 1953, p. 61-62.

Corrosion problem, inspection procedure and pipe examination. (R11, S13)

344-R. A Development in Tank Heating Coils. *Petroleum,* v. 16, Aug. 1953, p. 223.

A cruciform cast iron pipe and joints which outlast previous piping in tanker heating coils because of its corrosion resistance. (R general)

345-R. (French.) **Protection of Metallic Constructions Against Atmospheric Corrosion.** D. Bermane. *Ossature Metallique,* v. 18, no. 6, June 1953, p. 333-340.

Various points and importance of sanding and acid treatment before application. Diagrams, graphs, tables, photographs. 10 ref. (R3, L26)

346-R. (German.) **The Effect of the Oxidizing Influence of Atmospheric Air on the Operation of Electrical Contacts.** R. Palme. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 177-184.

Conductivity-reducing effect of oxide scales formed at different temperatures on a variety of metals and alloys. Tables, graphs, diagrams, photographs. 8 ref. (R2, Ag, Cu, Pt, Au, W, Mo)

347-R. (Russian.) **Application of Profilometer to the Study of Structural Corrosion.** O. G. Deriagina and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 6, Aug. 21, 1952, p. 1305-1308.

Changes of surfaces were investigated on Zn, Al, Fe, and their alloys. (R11, Zn, Al, Fe)

348-R. (Russian.) **Electrochemical Character of Metallic Corrosion in Hydrocarbon Solutions of Iodine.** L. G. Lindim. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 753-756.

Essential role of the electrochemical mechanism in corrosion processes. Schematic diagram, graphs. 9 ref. (R1, R6, Cu, Pb, Fe)

349-R. (Russian.) **Corrosion Inhibitors for Metals.** L. G. Gindin and I. N. Putilova. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952, p. 973-975.

Mechanisms of passivation and corrosion inhibition in hydrocarbon solutions. Graphs. 5 ref. (R10)

350-R. (Russian.) **On the Mechanism of Metal Corrosion by Hydrocarbon Solutions of Sulfur.** L. G. Gindin and T. A. Miskinova. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 6, Oct. 21, 1952, p. 1145-1146.

Possible explanation of the action of such compounds. 10 ref. (R6)

351-R. (Russian.) **Corrosion Properties of Alloying Elements of Stainless Steel in Oxidizing Solutions.** M. M. Kurtepov and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 795-796.

It was shown experimentally that Cr has low corrosion resistance in HNO_3-$K_2Cr_2O_7$ solutions, especially at high temperatures. (R5, Cr)

352-R. Rust Prevention by Pre-Treatment. *Chemical Age,* v. 69, July 1953, p. 175-176.

Process of pretreatment to prevent corrosion. Photograph. (R10)

353-R. Corrosion of Steel by Air-Free, Dilute, Weak Acids. Norman Hackerman and E. E. Glenn, Jr. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 339-344.

Paper prepared for delivery before the Montreal Meeting of the Electrochemical Society, Oct. 26-30, 1952. Investigation of the kinetics of the reaction between steel and acetic acid without influence of a nonaqueous phase and under controlled conditions wherein only the

concentration of the acidic constituents varied. Graphs. (R5, CN)

354-R. The Kinetics of the Initial Corrosion of Copper in Aqueous Solutions. George Richard Hill. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 345-350.

Paper prepared for delivery before the Buffalo Meeting of the Electrochemical Society, Oct. 11-14, 1950. Experiments using an electroreduction cell coupled to a recording electronic voltmeter to determine thickness of very thin films of corrosion products on Cu surface. Data used to determine the rate laws and to evaluate the specific rate constant for the initial corrosion process. Tables, graphs. 20 ref. (R5, Cu)

355-R. Corrosion in Condensate Return System. J. L. Thornley. *Industry and Power,* v. 65, Aug. 1953, p. 58-60.

Influencing factors, effect of impurities, corrosion prevention and methods of feed treatments. Diagrams. (R4)

356-R. Disintegration Test for Welded Austenitic Chromium-Nickel Corrosion Resisting Steel. *Institute of Welding, Transactions,* v. 16, June 1953, p. 80-81.

An intercrystalline corrosion test. Diagrams. (R2, K9, SS)

357-R. The Galvanic Corrosion Theory for Adherence of Porcelain-Enamel Ground Coats to Steel. D. G. Moore, J. W. Pitts, J. C. Richmond, and W. N. Harrison. *National Advisory Committee for Aeronautics,* Technical Note 2935, June 1953, 19 p.

The galvanic theory of adhesion between ground coat enamels and steel. Diagrams, photographs, graphs. 11 ref. (R1, L27, ST)

358-R. Controlling Corrosion. *Oil and Gas Journal,* v. 52, Aug. 17, 1953, p. 155.

Control method in which a current is forced through pipe. Current may be furnished from ordinary power sources, a rectifier set-up, or galvanic anodes. Diagrams. (R10)

359-R. Applications of Stainless Steel. W. L. Nelson. *Oil and Gas Journal,* v. 52, Aug. 17, 1953, p. 156.

Corrosive conditions which require use of stainless steels.
(R general, T general, SS)

360-R. Casebook of a Corrosion Chemist. Maxey Brooke. *Petroleum Refiner,* v. 32, Aug. 1953, p. 131-132.

Five corrosion problems and how they were solved. Photographs.
(R general, Cu, CN)

361-R. Appraisal of Alkaline Digester Corrosion Problems. H. O. Teeple. *Southern Pulp and Paper Manufacturer,* v. 16, Aug. 1953, p. 62-64, 66.

Paper presented before the joint fall meeting of the Southeastern and Southern Divisions of the American Pulp and Paper Mill Superintendents Assoc., Oct. 8-10, 1952, at Roanoke, Va. Survey conducted to determine extent and conditions affecting corrosion of digesters.
(R5, CN, SS)

362-R. (French.) Passivation of Aluminum Submerged in a Nitric Medium. Jos. Patrie. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 87-95.

Reviews work on oxidation of Al in nitric bath. Influence of additional elements and nature of oxide film. Tables, graphs, photographs. (R10, Al)

363-R. (German.) The Preservation of Light Metals. G. Dallmeyer. *Aluminium,* v. 29, no. 5, May 1953, p. 189-194.

Preservatives used for light metal sheet, strip and tubes against corrosion damage in storage or service. Photographs. (R10, Al)

364-R. (German.) The Behavior of Light Metal Alloys Exposed to Sea Water. *Aluminium,* v. 29, no. 5, May 1953, p. 203-206.

Corrosive effect of sea atmosphere on light metals. Tables. 8 ref.
(R3, Al, Mg)

365-R. (German.) Materials for High Steam Temperatures. Cl. Holzhauer. *Brennstoff-Wärme-Kraft,* v. 5, no. 7, July 1953, p. 234-236.

Development of new high-temperature steels. Computes life of the steel and determines the date on which a given part must be replaced. (R4, AY)

366-R. (German.) Attack of Iron by Liquid Zinc. R. Haarmann. *Metall,* v. 7, nos. 11/12, June 1953, p. 406-412.

Surface erosion of steel; eating of holes; attack of grain boundary; possibilities for future research, especially in hot galvanizing. Photographs, diagrams. 8 ref.
(R6, L15, Fe, Zn, ST)

367-R. (Hungarian.) Some New Points of View on the Application of Light Metals in the Construction of Equipment for the Chemical Industry, II. Andras Domony. *Aluminium,* v. 5, no. 4, Apr. 1953, p. 88-91.

Corrosion resistance of various Al-Mg-Si alloys. Process of gluing light metal pieces. Tables.
(R general, T29, Al)

368-R. (Hungarian.) Defects on a Cast Iron Steam Turbine Shell. Fer-

enc Boda and Zoltan Hegedüs. *Ontöde*, v. 4, no. 3, Mar. 1953, p. 69-70.
Corrosion proceeding along the graphite veins. Micrographs. (R2, CI)

369-R. (Russian.) Corrosion of Steel by Kerosense and Methods of Combating It. I. N. Putilova, L. G. Gindin, E. V. Artamonova, and V. A. Kazakova. *Zhurnal Prikladnoi Khimii*, v. 26, no. 2, Feb. 1953, p. 148-154.
Analytical data, initiating substances, stimulants and a number of organic compounds inhibiting the process. Tables. 20 ref. (R7, ST)

370-R. The Electrochemical Behaviour of Metals and Corrosion. M. Pourbaix. *Chemistry & Industry*, July 25, 1953, p. 780-786.
Describes above by use of experimental cells with steel, Cu, Pb, iron, and stainless steel. How applied potential controls corrosion. (R11, Cu, Pb, Fe, ST, SS)

371-R. Other Elements in Zinc Coatings. D. J. Swaine. *Chemistry & Industry*, July 25, 1953, p. 799-800.
Three samples of zinc coatings showed no marked changes in quality with traces of Pb, Sn, Fe, Cd, Cu, Al, Si, In, Mn and Ni. (R11, Zn, Pb, Sn, Fe, Cd, Cu, Al, Si, In, Mn, Ni)

372-R. Cathodic Protection of Active Ships In Sea Water With Graphite Anodes. K. N. Barnard, G. L. Christie, and J. H. Greenblatt. *Corrosion (Technical Section)*, v. 9, Aug. 1953, p. 246-250.
Trials on three steel tugs with impressed current cathodic protection systems. Graphs, photographs. (R10, ST)

373-R. Corrosion Resistance of High-Strength Low-Alloy Steels as Influenced by Composition and Environment. C. P. Larrabee. *Corrosion (Technical Section)*, v. 9, Aug. 1953, p. 259-271.
Corrosion resistances of several high-strength low-alloy steels in various atmospheres, natural waters and soils are compared with those of structural Cu steel and C steel in same environments. Effects of variables that influence corrosion of these steels in the different media. Micrographs, graphs, tables. 41 ref. (R3, R4, R8, AY, CN)

374-R. Filiform Corrosion. M. Van Loo, D. D. Laiderman, and R. R. Bruhn. *Corrosion (Technical Section)*, v. 9, Aug. 1953, p. 277-283.
Paper presented at Ninth Annual Conference, National Assoc. of Corrosion Engineers, Chicago, Ill., Mar. 16-20, 1953. Occurrence, factors involved, laboratory study and thermodynamic considerations. Diagrams, micrographs. 14 ref. (R1)

375-R. Accelerating Effect of Decreasing Temperature on Corrosion by Glycol Solutions. D. Caplan and M. Cohen. *Corrosion (Technical Section)*, v. 9, Aug. 1953, p. 284-286.
Corrosion of galvanized steel in solutions of CH_2OHCH_2OH containing $Na_2B_4O_7$. Tables. (R7, CN, Zn)

376-R. Corrosion by Aqueous Solutions at Elevated Temperatures and Pressures. F. H. Beck and M. G. Fontana. *Corrosion (Technical Section)*, v. 9, Aug. 1953, p. 287-293.
Paper presented at Ninth Annual Conference, National Assoc. of Corrosion Engineers, Chicago, Ill., Mar. 16-20, 1953. Data on corrosion by HNO_3, H_3PO_4, CH_3COOH, and NaOH at temperatures up to 425° F. Metals and alloys include CF-8, CF-8M, CN-7MCu, CB-30, cast Ti, and high-Si iron. Photographs, graphs, tables. (R5, Ti, AY, Cr, Ni)

377-R. Volatile Corrosion Inhibitor Insures Rust-Free Die Sets. David Myers. *Machinery (American)*, v. 59, Aug. 1953, p. 195-197.
Use of a volatile powder to inhibit corrosion in transporting metal parts. Photographs. (R10)

378-R. Organic Inhibitor Controls Refinery Corrosion. C. C. Hulbert and J. A. Rippetoe. *Oil and Gas Journal*, v. 52, Aug. 17, 1953, p. 120-122, 124, 126-127.
Paper presented at A.P.I. Division of Refining meeting, New York, 1953. Successful experiment using an organic inhibitor which is thought to adhere to the metal in a semichemical fashion and to form a mechanical barrier between the metal and corrosive materials. Photographs, graphs. (R10)

379-R. Carbon Dioxide Corrosion Reduced. J. C. Albright. *Petroleum Engineer*, v. 25, Aug. 1953, p. C37-C38.
How heat and aeration reduce corrosion of steel and fittings due to a high saturation of the water with CO_2. (R10, ST, CI)

380-R. Operation and Maintenance of Rectifiers. J. C. Berringer. *Petroleum Engineer*, v. 25, Aug. 1953, p. D19-D20, D22.
Factors which enter into selection, installation and maintenance of rectifier units for cathodic protection. Photographs. (R10)

381-R. A Corrosion Study of Various Chromium Plated Electrodeposits. H. Brown and E. W. Hoover. *Plating*, v. 40, Aug. 1953, p. 874-878, 883-885; disc., p. 885-886.

Corrosion results in salt-spray, humidity and outdoor exposure tests for various coatings which are cathodic to steel. Diagrams, micrographs. 12 ref.
(R11, Ni, Cu, Cr, Au, Rh)

382-R. Analysis of Variability in Accelerated Corrosion Testing Cabinets. V. V. Kendall. *American Iron and Steel Institute,* New York, May 1953, 17 p.

A study of the reproducibility obtainable in spray or humidity test cabinets. Tables, diagram. (R11)

383-R. (French.) Corrosion Test for Welded Austenitic or Chromium-Nickel Corrosion Resistant Steel. *Soudure et Techniques Connexes,* v. 7, nos. 5-6, May-June 1953, suppl. p. 1-2.

Preparation of specimens and method of testing. Diagrams. (R11, SS)

384-R. The Place for Zinc in Cathodic Protection. H. W. Wahlquist. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 117-121.

Advantages of Zn usage. (R10, Zn)

385-R. Laboratory Investigation of Superheater-Tubing Materials in Contact With Synthetic Combustion Atmospheres at 1350° F. C. J. Slunder, A. M. Hall, and J. H. Jackson. *ASME, Transactions,* v. 75, Aug. 1953, p. 1015-1019; disc., p. 1019.

Variables in the corrosive environment included two concentration levels of SO_2, CO, and alkali-metal salts. Tables, diagram, graph. (R11, AY)

386-R. Resistance of Cast Fe-Cr-Ni Alloys to Corrosion in Oxidizing and Reducing Flue-Gas Atmospheres. J. H. Jackson, C. J. Slunder, O. E. Harder, and J. T. Gow. *ASME Transactions,* v. 75, Aug. 1953, p. 1021-1034; disc., p. 1034-1035.

Attention was directed primarily toward attack by S-containing gases. Micrographs, diagrams, tables, photographs, graphs. 13 ref. (R9, Fe, Cr, Ni)

387-R. Corrosion of Mercury-Boiler Tubes During Combustion of a Heavy Residual Oil. A. M. Hall, D. Douglass, and J. H. Jackson. *ASME, Transactions,* v. 75, Aug. 1953, p. 1037-1049.

Test procedure and results determining causes of corrosion and possible remedies. Tables, diagrams, graphs. 15 ref. (R7, AY)

388-R. Underground Corrosion of Galvanized Steel Pipe. Michael Lorant. *British Steelmaker,* v. 19, Aug. 1953, p. 472-473, 485.

Compares uncoated and galvanized steel. Photograph, graph. (R8, CN)

389-R. On High-Temperature Sulphurization of Chromium Cast Iron and Chromium Cast Steel. Masakazu Shiozawa and Hiroshi Nakai. *Castings Research Laboratory, Report,* no. 4, 1953, p. 17-19.

Relations between Cr content and loss of weight due to H_2S attack of Cr-cast iron and steel. (R6, CI)

390-R. Why Gas Plants Should Be Surveyed to Determine Corrosion Damage. E. W. Wallace. *Gas Age,* v. 112, Aug. 13, 1953, p. 47-49, 74, 77.

Presented before annual convention, Natural Gasoline Association of America, Houston, Tex., May 1, 1953. Typical field experience with gas plant equipment and accessories. Emphasizes that corrosion is not limited to the wells alone. (R11)

391-R. Scale Formation in Sea-Water Distilling Plants and Its Prevention. H. Hillier. *Institution of Mechanical Engineers, (London), Proceedings, Steam Group,* v. 1B, no. 7, 1952, p. 295-314.

Performance of plants and scale prevention. Graphs, tables, diagrams, photographs. (R2, R4)

392-R. New Tests Prove Materials for Nuclear Power Plants. Robert F. Koenig. *Iron Age,* v. 172, Aug. 20, 1953, p. 129-133.

Corrosion of structural metals by liquid Na. Data on resistance of materials to liquid metals. Graph, table, diagram, photographs. (R6)

393-R. Laboratory Measurement of the Corrosion of Ferrous Metals in Soils. W. J. Schwerdtfeger. *Journal of Research, National Bureau of Standards,* v. 50, June 1953, p. 329-336.

Method for setting up soil-corrosion cells using a soil-wetting procedure that gives reproducible results. Weight losses on electrodes made of steel and of cast iron were compared after exposure to various soils for six months. Tables, diagrams. 12 ref. (R11, R8, ST, CI)

394-R. Corrosion Cracking of Martensitic Stainless Steel. A. E. Durkin. *Metal Progress,* v. 64, July 1953, p. 72-75.

Data showing cracking is caused by hydrogen embrittlement under certain corrosive conditions. Graphs. (R1, SS)

395-R. Corrosion of 18-8 in Oxidizing Solutions. M. M. Kurtepov and G. V. Akimov. *Metal Progress,* v. 64, July 1953, p. 124, 126.

Translated and condensed from "Corrosion Properties of Stainless Steels in Oxidizing Solutions", *Doklady Akademii Nauk SSSR,* v. 87, 1952, p. 1005. Results of influence of additions of $K_2Cr_2O_7$, NH_4VO_3, and KIO_3 to HNO_3 on the electrode

potentials and kinetics of electrode processes on stainless steels. (R5, SS)

396-R. Corrosion for Pipeliners. Corrosion Control an Economic Necessity. Starr Thayer. *Pipe Line News,* v. 25, Aug. 1953, p. 39-41.

Costs of corrosion to the pipeline industry. (R general)

397-R. Port Townsend Digesters. Corrosion Developments and How They Were Met. H. E. Bukowsky. *Pulp & Paper,* v. 27, Aug. 10, 1953, p. 55-58.

Corrosion and treatment in pulp digesters. (R general)

398-R. How They Resist Corrosion. *Railway Age,* v. 155, Aug. 10, 1953, p. 87-89.

Comparative corrodibility of Cr-Mn and Cr-Ni stainless steels. Photographs. (R general, SS)

399-R. What Corrosion Inhibitors Should and Should Not Do. J. F. Wilkes. *Railway Locomotives and Cars,* v. 127, Sept. 1953, p. 77-83.

Solutions to problems of treatment of diesel-engine cooling water. Photographs. (R10)

400-R. Oil Industry Tries Out Aluminum for Pipe Line. *Welding Journal,* v. 32, Aug. 1953, p. 740-741.

Corrosion resistance and welding of pipes. (R general, K general, Al)

401-R. The Chemical Resistance of Glass Fused to Steel. E. A. Sanford and O. J. Britton. *American Society for Testing Materials,* Preprint no. 92a, 1953, 6 p.

Resistance to acid corrosion. Table, photographs. (R6, ST)

402-R. The Corrosion of Beryllium Copper Strip in Sea Water and Marine Atmospheres. John T. Richards. *American Society for Testing Materials,* Preprint no. 71, 1953, 18 p.

Results for corrosion tests on Be-Cu and Be-Co-Cu conducted over the past two years. Tables, graphs, photographs. 12 ref. (R4, R3, Co, Be, Cu)

403-R. Report of Committee A-5 on Corrosion of Iron and Steel. A. P. Jahn, chairman. *American Society for Testing Materials,* Preprint no. 3, 1953, 33 p.

Work on atmospheric exposure tests and tests for weight of Zn coatings. Tables, photographs. (R11, L general, Fe, ST, Zn)

404-R. Report of Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. K. G. Compton, chairman, *American Society for Testing Materials,* Preprint no. 9, 1953, 2 p.

Reports on spray tests, atmospheric corrosion, and galvanic and electrolytic corrosion. (R11, R1, R3, EG-a)

405-R. Report of Committee D-12 on Soaps and Other Detergents. J. C. Harris, chairman, *American Society for Testing Materials,* Preprint no. 43, 1953, 10 p.

Revisions of specifications and proposed method of test for determining the corrosive effects of metal cleaners. (R7, L12)

406-R. On the Mechanism of the Dissolution of Magnesium in Acidic Salt Solutions. I. Physical Control by Surface Films. E. J. Casey and R. E. Bergeron. *Canadian Journal of Chemistry,* v. 31, Sept. 1953, p. 849-867.

An example of the simplest type of corrosion involving H_2 evolution. Results indicate presence of a surface film of oxide or hydroxide even in acid solutions. Graphs, tables. 24 ref. (R5, Mg)

407-R. The Corrosion Forum. Cast High Alloys. E. A. Schoefer. *Chemical Engineering,* v. 60, Oct. 1953, p. 298, 300. 302, 304, 306, 308-312.

Difference in performance between cast and wrought alloys. Photographs, graphs, tables. (R general, SS)

408-R. The Corrosion Forum. Zirconium. John D. Roach. *Chemical Engineering,* v. 60, Sept. 1953, p. 304, 306, 308.

Performance of Zr and its similarity to Ti metal. Charts. 11 ref. (R general, Zr)

409-R. Special Steels for the Petroleum Chemicals Industry. E. Smith. *Chemistry and Industry,* 1953, Aug. 10, p. S9-S17.

Characteristics and performance of nine stainless steels as applies to high-temperature and corrosion resistance properties. Micrographs, tables. (R general, SS)

410-R. Corrosion-Fatigue Failure of a Marine Propeller Shaft. Carl A. Zapffe. *Corrosion,* v. 9, Sept. 1953, p. 298-302.

Forms of fracture in which chemical attack combines with mechanical stress to destroy an engineering structure. Fracture terminology. Photographs, micrographs. 13 ref. (R1, Q26, ST)

411-R. Cathodic Protection of Underriver Pipe Lines. C. C. Loyd and John R. Whitney. *Corrosion,* v. 9, Sept. 1953, p. 303-306.

Details of design, installation, and legal problems. Diagrams, table. (R10)

412-R. Studies on Water-Dependent Corrosion in Sweet Oil Wells. H. E.

Greenwell. *Corrosion,* v. 9, Sept. 1953, p. 307-312; disc., p. 312.

Present understanding of problems and means of detection and control. Tables. (R7)

413-R. Corrosion of Casing in Oil and Gas Wells. Jack L. Battle. *Corrosion,* v. 9, Sept. 1953, p. 313-320.

Various causes of corrosion failures, methods of repair and preventive measures currently practiced. Tables. 8 ref. (R general)

414-R. Casing Corrosion in West Texas-New Mexico. R. L. Elkins. *Corrosion,* v. 9, Sept. 1953, p. 321-324.

Casing repair methods and corrosion mechanisms, detection and control. Photographs. (R general)

415-R. Cable System Design for Cathodic Protection Rectifiers. Ray M. Wainwright. *Corrosion,* v. 9, Sept. 1953, p. 325-328.

Considerations involved and economic implications of cable design. Tables, graph. (R10)

416-R. Some Notes on the Oxidation Resistance of Boron-Containing Chromium-Nickel-Cobalt-Iron Alloys. W. O. Binder and E. D. Weisert. *Corrosion,* v. 9, Sept. 1953, p. 329-332.

Effect of B on oxidation resistance of alloys. Tables, graphs. (R2)

417-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Sept. 1953, p. 95A-96A, 101A.

A new high-temperature Cr-Ni-W alloy suitable for applications up to 2200° F. Photographs, tables. (R general)

418-R. Corrosion-Inhibitive Compositions as Temporary Protectives of Steel Against Atmospheric Corrosion. B. Sanyal and R. St. J. Preston. *Journal of Applied Chemistry,* v. 3, Aug. 1953, p. 366-374.

Performance of 16 aqueous systems investigated. Bentonite pastes gave best results and were easier to use. Emulsions with castor oil, hydrocarbon oils and bitumens were evaluated. Tables, graphs. 10 ref. (R3, R10, ST)

419-R. High Pressure Oxidation Rate of Metals. Copper in Oxygen. William McKewan and W. Martin Fassell, Jr. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1127-1130.

Oxidation rates of Cu were determined from 600 to 900° C. in O_2 from 14.7 to 400 psi. total O_2 pressure. Graphs. (R3, Cu)

420-R. Tests Show Corrosion Resistance of Aluminum. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Light Metal Age,* v. 11, Aug. 1953, p. 18-19, 22, 28.

Tests made over a period of years exposing Al specimens to the atmosphere. Diagrams. (R3, Al)

421-R. Corrosion of Structural Materials in Water. C. R. Breden, S. Greenberg, R. M. Robinson, A. H. Roebuck, V. F. Saitta, and C. C. Scott. *Metal Progress,* v. 64, Aug. 1953, p. 194, 196, 198, 200.

Digest of "Water Corrosion of Structural Materials," Report No. ANL 4519, Argonne Nat'l. Laboratory, July 1951. Results of extensive tests on stainless steel and other materials in H_2O from 70 to 650° F. (R4)

422-R. Intergranular Corrosion of High-Purity Aluminum. M. J. Lavigne. *Metal Progress,* v. 64, Sept. 1953, p. 84-86.

Mechanism of corrosion by distilled H_2O at 100 and 150° C. Micrographs. (R2, Al)

423-R. Watch that Arc! It's a Hazard in Cathodic-Protection Cables. Marshall E. Parker. *Oil and Gas Journal,* v. 52, Sept. 7, 1953, p. 97, 119.

Emphasizes danger of cutting a pipeline carrying a current. Suggests installation of a temporary bond across any joint to be broken, so arranged that it can be opened at a location free from dangerous vapors. Diagrams. (R10)

424-R. Corrosion in Pulp & Paper Industry. F. A. Guba. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 72, 74, 77.

Types of corrosion encountered in paper mills. Suggests alloys suitable for use in paper-mill equipment. Tables. (R general, T29, SS)

425-R. Solving Corrosion Problems in the Paper Industry With Plastics. Raymond B. Seymour and George P. Gabriel. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 98, 100, 102, 108, 146.

Coatings, membrane linings and chemical resistant cements. (R10, L26)

426-R. Practical Solutions to Five Common Corrosion Problems. John F. Mason. *Petroleum Processing,* v. 8, Sept. 1953, p. 1332-1335.

Corrosion of polycharge preheaters, crude fractionating tower tops, amine gas plant reboiler tubes, Linde gasoline treater eductors and gasoline condenser equipment. Tables.
(R general, Ni, Cu, Al, SS, CN, CI)

427-R. Considerations Involved in the Selection and Use of Stainless Steels. E. Smith. *Sheet Metal Indus-*

tries, v. 30, no. 317, Sept. 1953, p. 763-766, 820.

Properties of several types of corrosion resistant steels. Photographs, tables.
(R general, T general, SS)

428-R. Aluminum "Self-Stops" Corrosion. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Steel,* v. 133, Sept. 7, 1953, p. 134-136.

Paper presented at 1953 meeting of National Association of Corrosion Engineers, Chicago. Outdoor weathering test results. Graphs.
(R3, Al)

429-R. Water Treatment for Corrosion Control. G. B. Hatch. *Steel,* v. 133, Sept. 21, 1953, p. 181, 183, 187-188, 194.

Treatment by removal or neutralization of factors favoring corrosion or by reinforcing inhibitors. Photographs, graph. (R10)

430-R. Some Observations on the Causes and Prevention of Kraft Digester Corrosion. Edward W. Hopper. *Tappi,* v. 36, Aug. 1953, p. 345-352.

Variables in the steel, liquor and circulation which may influence corrosive or erosive attack. Results of chemical, spectroscopic and microscopic examination of digester steel samples. Method used in increasing the life of seriously thinned digesters. Tables, micrographs.
(R7, CN)

431-R. (English.) **The Relationship Between the Work Function of a Metal and Its Energy of Activation for Oxidation.** A. F. H. Ward and N. R. Bharucha. *Recueil des travaux chimiques des Pays-Bas,* v. 72, no. 8, Aug. 1953, p. 735-738.

Correlation coefficient is fairly constant with a tendency to decrease slightly with increased atomic number. 27 ref.
(R2, P15, Cr, Cu, Co, Fe, Pt, W, Ni, Ag, Au, Sn)

432-R. (French.) **Microscopic and Interferometric Observations of Corrosion Figures and Their Interpretation by Means of Dislocations.** R. Gevers. *Journal de chimie physique,* v. 50, no. 5, May 1953, p. 321-328.

Importance of Burgers dislocations in the corrosion phenomenon. Topaz and SiC crystals were studied. Micrographs. 15 ref. (R11)

433-R. (French.) **Corrosion of a Light Alloy by an Electrolytic Couple.** Pierre A. Jacquet. *Revue de l'Aluminium,* v. 30, no. 200, June 1953, p. 217-224.

Metallographic examination and corrosion tests proving that the alloy was sensitized to channeling corrosion. Tables, micrographs. 7 ref. (R1, Mg, Al, Zn)

434-R. (German-French.) **A Traveling Radio Tower.** *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 136-138.

Corrosion resistance and performance of a radio tower made of "Anticorodal" in 1939. Photographs.
(R3, T1, Al)

435-R. (German.) **Influence of Customary Cooling Agents on Aluminum Alloys.** H. Kessler. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 315-317.

Results of laboratory experiments to determine corrosive effects.
(R2, Al)

436-R. (German.) **Results of Dew-Point Measurements in High-Pressure Boilers.** F. Henning and H. Rögener. *Brennstoff-Wärme-Kraft,* v. 5, no. 8, Aug. 1953, p. 269-272.

Evolution of device for determining dew point from electrical conductivity of moisture precipitated. Proven cases of corrosion were attributable to exceeding the dew point. Photographs, diagrams. 6 ref. (R4)

437-R. (German.) **Anticorrosive Grounding Colors for Magnesium.** *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 617.

Tests of chromate paints to determine solubility in seawater.
(R4, Mg)

438-R. (German.) **Intercrystalline Stress Corrosion of Non-Alloyed and Low-Alloyed Steels and Its Prevention by Additions of Titanium or Tantalum-Niobium.** Ewald Baerlecken and Walter Hirsch. *Stahl und Eisen,* v. 73, no. 12, June 1953, p. 785-789.

Test methods, alkali resistance, effect of welding and changes in structure. Photographs, graphs. 9 ref. (R1, ST, AY)

439-R. (German.) **Cathodic Corrosion Protection of Steel and Iron.** Heinrich Klas. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 971-974.

Principles and techniques. Tables, diagram, photograph. 13 ref.
(R10, ST, CI)

440-R. (German.) **Corrosion and Protection Against Corrosion of Iron and Steel.** Heinrich Steinrath. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1109-1116.

Survey of literature for the years 1950 and 1951. 262 ref.
(R general, Fe, ST)

441-R. (German.) **Biological Corrosion of Iron and Steel.** Günther Seelmeyer. *Werkstoffe und Korrosion,* v. 4, no. 7, July 1953, p. 241-247.

Knowledge and theory; lists preventives. Diagrams, tables. 33 ref. (R1, CI, ST)

442-R. (German.) **Attack of Platinum by Hydrogen Chloride.** H. v. Wartenberg. *Zeitschrift für anorganische und allgemeine Chemie,* v. 273, nos. 1-2, July 1953, p. 91-95.

Corrosion products and effects of other chlorides. 3 ref. (R6, Pt)

443-R. (German.) **Solution of Iron in Nitric Acid. T.** G. Owe Berg. *Zeitschrift für anorganische und allgemeine Chemie,* v. 273, nos. 1-2, July 1953, p. 101-112.

Dependence of saturation value and beginning and final velocities on concentration of acid, temperature, acid volume, sample surface and stirring was determined. Interrelationships. Graphs, tables. 13 ref. (R5, Fe)

444-R. (German.) **Mechanism of Fissure Formation in Stress Corrosion of Homogeneous Solid Solutions. II. Intercrystalline Fissure Formation of a Hard-Rolled Silver-Gold Alloy as a Function of Extent of Recrystallization.** Ludwig Graf and Gertrud Fahrner. *Zeitschrift für Metallkunde,* v. 44, no. 7, July 1953, p. 302-306.

A 33.3 wt. % Au alloy was used Photographs, graphs, diagrams. 10 ref. (R1, Au, Ag)

445-R. (Italian.) **The Corrosion Resistance of Aluminum and Its Alloys in Industrial Atmospheres.** G. Luft and A. Perrone. *Alluminio,* v. 22, no. 3, Mar. 1953, p. 256-269.

Results of corrosion resistance tests on coated or unprotected specimens. Tables, graphs, photographs, micrographs. (R3, Al)

446-R. (Italian.) **Stainless Steel Research Work. III. Passivity of 18-8 Austenitic Steels.** A. Ferri. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 203-207.

Effect of the superficial state of the metal and crystallographic orientation on passivity. Tables, graphs, photographs, diagrams. 20 ref. (R10, SS)

447-R. (Polish.) **Polarographic Method of Examining Corrosion of Steel.** St. Minc. *Przemysl Chemiczny,* v. 8, no. 10, Oct. 1952, p. 443-447.

Optimum conditions for using changes in the magnitude of O_2 wave for classifying steel according to its anticorrosive properties. Graphs, tables, diagram. 9 ref. (R11, ST)

448-R. (Russian.) **Overpassivation of Steels in Oxidizing Media.** V. P. Batrakov and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 321-323.

Corrosion stability of 0.1% carbon steel and 0.3% C low-alloy chrome steel in HNO_3 of high concentration. Graphs. 7 ref. (R10, CN, AY)

449-R. (Spanish.) **Stainless Steel in the Chemical Industry.** Luis Jansana. *Afinidad,* v. 29, nos. 119-120, Nov.-Dec. 1952, p. 521-527.

Corrosion resistance of various stainless steels. Tables. (R general, SS)

450-R. (Book.) **Corrosion—A Short Course.** 148 p. Feb. 1952. Dept. of Conf. & Spec. Activities, University Extension, University of California Press, Los Angeles 24, Calif. $2.00.

Consists of 25 lectures covering corrosion costs and control, nonferrous metals, soils, and coatings. (R general)

451-R. (Book.) **Symposium on Conditioning and Weathering.** ASTM Special Technical Publication, no. 133, 98 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $2.25.

Consists of 10 reports presented at ASTM 50th Anniversary Meeting, New York, June 24, 1952. (R3)

452-R. Intergranular Corrosion of Ferritic Stainless Steels. R. A. Lula, A. J. Lena, and G. C. Kiefer. *American Society for Metals, Preprint* no. 32, 1953, 27 p.

Susceptibility to intergranular attack in various acid mixtures when rapidly cooled from temperatures above 1700° F. Tables, graphs, micrographs, photographs, 12 ref. (R2, SS)

453-R. Tests on the Corrosion of Buried Iron and Steel Pipes. J. C. Hudson and G. P. Acock. *British Iron and Steel Research Association, Special Report* no. 45, 1952. p. 1-28; disc., p. 111-153.

Corrosion of cast iron pipes and tubes, buried in five representative soils for five years. Bare and coated specimens were tested. Tables. (R8, CI, ST, Zn)

454-R. Investigations on Underground Corrosion. K. R. Butlin, W. H. J. Vernon, and L. C. Whiskin. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 29-38; disc., p. 111-153.

Part I: Fundamental studies on sulphate-reducing bacteria and their effect on iron. Part II: Experiments on protection of ferrous pipes. Photograph, table. 8 ref. (R8)

455-R. Corrosion of Buried Copper and Ferrous Strip in Natural and Salted Soils. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 39-54; disc., p. 111-153.

Investigation to determine relative corrodibility in different soils. Effect of salt treatment. Tables, graphs. 2 ref. (R8, CI, CN, Cu, Fe)

456-R. Tests on the Corrosion of Buried Aluminium, Copper, and Lead. P. T. Gilbert and F. C. Porter. *British Iron and Steel Association, Special Report* no. 45. 1952. p. 55-74; disc., p. 111-153.

Tubes of commercial-purity Al, phosphorus-deoxidized arsenical Cu, and Pb were buried. Soils used were salt marsh, London clay, moist neutral clay, Keuper Marl, and cinders. Results of examination after burial for five years are given. Tables. 5 ref. (R8, Al, Cu, Pb)

457-R. Cathode Protection of Buried Metal Structures. R. de Brouwer. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 95-110; disc., p. 111-153.

Cathodic protection by polarized and forced drainage processes. Diagrams, graphs. (R10)

458-R. Cathodic Protection. K. A. Spencer. *British Iron and Steel Research Association, Special Report* no. 45. 1952. p. 75-94; disc., p. 111-153.

Principal causes of corrosion of buried steel structures and theory of protection by cathodic methods. Graphs, diagrams, table. 9 ref. (R10)

459-R. Corrosion Control of Steel Equipment. T. R. B. Watson. *Canadian Chemical Processing,* v. 37, Sept. 1953, p. 46, 48, 50, 52, 54.

Causes of corrosion and control by means of cathodic protection. (R10, ST)

460-R. Corrosion. A Field for Action. W. H. J. Vernon. *Chemistry & Industry,* 1953, no. 38, Sept. 19, p. 982-987.

Historical review. Diagram, graph. 6 ref. (R general)

461-R. Note on the Anomalous Behaviour of Ammonium Chloride Particles on the Corrosion of Steel in Humid Atmospheres. B. Sanyal and R. St. J. Preston. *Chemistry & Industry,* 1953, no. 38, Sept. 19, p. 995-997.

Corrosion rate was found to decrease with increased humidity. Photographs, tables. 6 ref. (R3, ST)

462-R. Corrosive Attack by Acidic Decomposition Products Evolved by Paints While Drying. *Corrosion,* v. 9, Oct. 1953, p. 344.

Helicopter blades, stored in painted boxes, were corroded by volatile acids from the drying paint. (R5, ST, Al, Mg)

463-R. Resistance of Aluminum Alloys to Weathering. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Corrosion,* v. 9, Oct. 1953, p. 345-358.

Results of extensive testing over a period of 20 years and actual use over 52 years. Photographs, tables, graphs. 11 ref. (R3, Al)

464-R. Some Marine Aspects of Cathodic Protection. K. N. Barnard. *Engineering Journal,* v. 36, Sept. 1953, p. 1131-1132, 1138.

Applications on ships' hulls. (R10)

465-R. How Cathodic Protection Can Slow Down Corrosion. A. W. Peabody. *Factory Management and Maintenance,* v. 111, Oct. 1953, p. 140-144.

Galvanic corrosion and uses and limitations of cathodic protection. Diagrams. (R10)

466-R. Corrosion in Closed Circulating Water Systems. Sidney Sussman and James B. Fullman. *Heating and Ventilating,* v. 50, Oct. 1953, p. 77-82.

Effect of temperature, O_2, chemicals, leakage and design on corrosion. Graphs, diagrams, photograph. (R4)

467-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Oct. 1953, p. 95A-97A.

Electrolytic etching of cast and wrought stainless steels in oxalic acid (15 min.) as a screening procedure for the 240-hr. nitric acid test. Photographs, micrographs. (R6, SS)

468-R. 430 Stainless Is Hardy Civilian. A. H. Thomas. *Steel,* v. 133, Sept. 28, 1953, p. 88-89.

Outdoor corrosion research. Photographs. (R3, SS)

469-R. Vulnerability of Drill Pipe to Corrosion Fatigue. Stanley C. Moore and A. P. Farr. *World Oil,* v. 137, Oct. 1953, p. 200, 202, 204, 206, 208.

Corrosion problems in drilling oil wells in the Permian Basin. Graph, photograph. 8 ref. (R2, CN)

470-R. (French.) **Practical Considerations of Titanium.** *Metallurgie et la construction méchanique,* v. 85, no. 8, Aug. 1953, p. 615-617.

Corrosive action of salt water. Difficulties of obtaining pure Ti. Mechanical properties of sheet and bar Ti and Ti alloys. Table, graph. (R5, Q general, C general, Ti)

471-R. (French.) **Gaps in Aluminum Layer on Clad Au-G Alloy (Duralumin) in Relation to Protection Afforded Against Corrosion.** G. Gauthier. *Revue de metallurgie,* v. 50, no. 8, Aug. 1953, p. 551-557.

Tests to determine the effect of

scratches accidentally made during fabrication or service. Graphs, micrographs. (R2, Al)

472-R. (German.) **Corrosive Effects of Varying Concentrations of Nitric and Sulfuric Acids on Welds of Aluminum and Aluminum Alloys.** Waldemar Bleicher and Albrecht Müller-Busse. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 273-280.

Concentrations of either acid acted rapidly on the welds. Graphs, micrographs, photographs. 5 ref. (R5, K general, Al)

473-R. (German.) **Corrosive Action of Highly Concentrated Nitric Acid on Iron.** Erich Fitzer, Hans Hohn, and Johann Sekal. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 290-298.

Influence of test conditions, pretest treatment and composition on intergranular attack is described. Photographs, graphs, tables. 10 ref. (R6, Fe)

474-R. (German.) **Corrosive Behavior of Iron-Containing 90/10 Copper-Nickel Alloys.** Karla Krafack and Erich Franke. *Werkstoffe und Korrosion,* v. 4, nos. 8/9, Aug./Sept. 1953, p. 310-315.

Behavior in sea water under various test conditions. Graphs, tables. (R4, Cu, Ni)

475-R. Methods of Controlling Corrosion. *American Gas Journal,* v. 179, Oct. 1, 1953, p. 137-138.

Avoiding corrosive areas of soil and coating surface of buried pipe. (R8)

476-R. Cathodic Protection. *American Gas Journal,* v. 179, Oct. 1, 1953, p. 138-140.

Techniques and applications of principle. Diagrams. (R10)

477-R. Atmospheric Exposure of Light Metals. L. H. Adam. *American Society for Testing Materials, Preprint* no. 13s, 1953, 24 p.

Tests using 27 aluminum and 8 magnesium alloys. Extensive photographs. (R3, Al, Mg)

478-R. Worthite. W. E. Pratt. *Chemical Engineering,* v. 60, Nov. 1953, p. 264, 266, 268, 270, 272, 274, 276, 278.

Resistance of high-chromium alloy to a number of corrosives, mechanical properties, and applications in chemical industry. (R general, Q general, T29, Cr)

479-R. Corrosion and Silting in Water Meters. P. Scanes. *Instrument Engineer,* v. 1, Oct. 1953, p. 69-71.

Meter design, effects of different waters, materials of manufacture and interference from foreign matter. Photographs, diagrams. (R4, S21)

480-R. Corrosion of Aluminium Alloys in Supply Waters. F. C. Porter and S. E. Hadden. *Journal of Applied Chemistry,* v. 3, Sept. 1953, p. 385-409.

Severe pitting of aluminum and its alloys caused by action of stagnant or slow-moving water. Tables, photographs, graphs. 8 ref. (R4, Al)

481-R. Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres. W. W. Binger, R. H. Wagner and R. H. Brown. *Light Metal Age,* v. 11, Oct. 1953, p. 18-22, 28.

Use of aluminum-base alloys in coke, soda ash, sulfur, power, paper, salt, petroleum and petrochemical industries has reduced corrosion losses with resultant savings in maintenance costs. Table, diagrams. (R3, T29, Al)

482-R. Cathodic Protection of Under River Pipe Lines. C. C. Lloyd and John R. Whiteney. *Pipe Line News,* v. 25, Oct. 1953, p. 46-51. Reprinted from *Corrosion,* v. 9, no. 9, p. 303-306.

Details of design including discussion of anodes and wiring. Table, diagrams, graphs. (R10, CN)

483-R. Packaged Corrosion Losing to VPI. William R. Wolfe. *Steel,* v. 133, Oct. 26, 1953, p. 132, 134-135.

Vapor phase inhibitor is efficient in preserving ferrous parts and is making many messy, expensive and inconsistent methods obsolete. Photographs, tables. (R10)

484-R. Uneven Corrosion in Alkaline Pulping Digesters. Francis W. Flynn, Frederick H. Richter, and Frederick B. Snyder. *Tappi,* v. 36, Oct. 1953, p. 433-444.

Major cause and possible cures. Diagrams, graphs, photographs. (R7, SS)

485-R. Corrosion and Deposits in Regenerative Air Preheaters. J. F. Barkley, Hilmer Karlsson, A. A. Berk, C. F. Stark and L. R. Burdick. *U. S. Bureau of Mines, Report of Investigations* 4996, 1953, 23 p.

Field tests made under regular operating conditions of an air preheater serving an underfeed, stoker-fired, water-tube boiler. Plant equipment. Pertinent plant operating data over testing period tabulated. (R11, Cu, SS, AY, CI)

486-R. Types of Corrosion. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 108-109.

Basic causes and various types. Photographs. (R general)

487-R. (German.) **Behavior of Aluminum Towards Food.** Franz Ritter. *Aluminium Ranshofen Mitteilungen,* 1953, no. 2, July, p. 35-37.

Corrosive effects. (R7, Al)

488-R. (German.) **Container Materials for Liquid Explosives Produced From Concentrated Nitric Acid.** Hans Hohn and Erich Fitzer. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, no. 9, Sept. 1953, p. 187-193.

Test data which indicate aluminum is superior to iron. (R6, T29, Fe, Al)

489-R. (German.) **The Corrosive Behavior of Special Cast-Brass Alloys.** E. Pelzel. *Metall,* v. 7, nos. 19-20, Oct. 1953, p. 767-771.

Tests on aluminum-containing brasses with additions of iron, manganese and nickel; silicon-containing brasses with additions of arsenic, lead, manganese and nickel; and copper-zinc alloys with nickel and tin. Tests were made in 10% hydrochloric acid solutions, synthetic seawater and 3% sodium chloride solution with 0.1% hydrogen peroxide. Graphs, tables. 8 ref. (R11, Cu, Al, Si, Zn, Ni, Sn, Fe, Mn, As, Pb)

490-R. (German.) **Extent of Flade Potential of Activation and Passivation of Iron, and Other Properties of the Passive Layer.** Klaus J. Vetter. *Zeitschrift für physikalische Chemie,* v. 202, nos. 1-2, July 1953, p. 1-13.

Explains positive potential value by fact that oxide at oxide-electrolyte surface is not saturated by dissolved Fe but becomes an unsaturated oxide through corrosion and has a much higher O_2 partial pressure. Diagrams, graph. 33 ref. (R10, Fe)

491-R. Aluminum Bronze Alloy Used in Large Cast Water Wheels to Resist Pitting by Cavitation. *Western Metals,* v. 11, Oct. 1953, p. 76-77.

Tensile strength; corrosion fatigue strength; hardness; yield point; cold working qualities; and how grain size, shape and structure affect ability of a metal to withstand pitting. Field tests with aluminum bronze alloy. Photographs. (R2, T25, Al)

492-R. (German.) **Behavior of Pure Aluminum and Superpure Aluminum in Boiling Water.** D. Altenpohl. *Aluminium,* v. 29, no. 9, Sept. 1953, p. 361-370.

Methods for applying colorless "Bohmit" films which offer corrosion protection against acids. Photographs, graphs, tables. 17 ref. (R4, Al)

493-R. (German.) **Experiences on Corrosion and Corrosion Protection on Iron and Steel.** (Review of Literature of 1950 and 1951). Heinrich Klas and Walter Hogartz. *Stahl und Eisen,* v. 73, no. 20, Sept. 24, 1953, p. 1302-1308.

Metallic and nonmetallic protective coatings. 134 ref. (R10, L general, Fe, ST)

494-R. (German.) **Increasing Corrosion-Fatigue Strength of Steel by Internal Stress.** Hans Bühler. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 27, Sept. 21, 1953, p. 945.

5 references. (R1, ST)

495-R. (Book.) **Corrosion of Buried Metals.** L. C. Whiskin, chairman. 1952. 153 p. British Iron and Steel Research Association, 11 Park Lane, London W. 1, England. (Special Report no. 45.)

Results of recent research and current information on the corrosion of buried metals. (R8)

SECTION S

INSPECTION and CONTROL

1-S. Some Problems in the Analysis of Steels by X-Ray Fluorescence. E. Gillam and H. T. Heal. *British Journal of Applied Physics,* v. 3, Nov. 1952, p. 353-358.

Measurement of proportion of elements of atomic numbers higher than 20 in steels by X-ray fluorescence using a Geiger-counter spectrometer was investigated, primarily to determine suitability as a rapid means of analysis during steelmaking, particularly for high-alloy steels. Possible improvements. Appendix gives theory of the method. Graphs and diagrams. (S11, SS)

2-S. New Flaw-Detecting Ink. *Chemical Age,* v. 67, Nov. 8, 1952, p. 637.

Use of special ink and ultraviolet light reveals cracks and internal flaws in ferrous metals. (S13, Fe)

3-S. Inwall Temperatures of Blast Furnaces. Samuel J. Paisley. *Instruments,* v. 25, Nov. 1952, p. 1571, 1610, 1612.

Use and placement of thermocouples. (S16, D1)

4-S. Gage Blocks: New System Widens Applications. *Steel,* v. 131, Nov. 24, 1952, p. 98-101.

Details of system which speeds up construction of gaging setups. Units were developed by DoAll Co., Des Plaines, Ill. Diagrams and illustrations. (S14)

5-S. What's Ahead the Next Ten Years in Inspection and Testing. *American Machinist,* v. 96, Mid-Nov. 1952, p. 1-19.

Instrumentation in general, gaging methods, quality control, metallurgical control of invisible defects, X-ray techniques, and statistical techniques. (S general)

6-S. Mechanical-Metallurgical Problems Associated With Mine Drilling Operations. T. W. Wlodek. *Canadian Mining and Metallurgical Bulletin,* v. 45, Nov. 1952, p. 651-657; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 55, 1952, p. 377-383.

Laboratory methods now employed for simulated service testing of tungsten carbide bits, conical push-on and threaded types of attachments, drill rods, and shank ends. Objectives of research program now being carried out. A number of mines were visited. Mechanical-metallurgical problems most frequently encountered and discussed during these visits. Diagrams, graphs, and illustrations. (S21, T28, W, C-n, TS)

7-S. Gamma Radiography in the Foundry. R. J. Hart. *Foundry,* v. 93, Nov. 20, 1952, p. 583-588.

Advantages of radiography for routine inspection of castings, using radioactive isotopes. Includes exposure charts and photographs of setups. (S13, CI)

8-S. Inspection Techniques for Quality Welding. William B. Bunn. *Industry & Welding,* v. 25, Dec. 1952, p. 66-68, 70-71, 73-74.

Codes and specifications; visual X-ray, betatron and Co^{60} methods of inspection. (To be concluded.) (S13, S22, K9)

9-S. Precision Inspection Checks Engine Components Rapidly, Accurately. Herbert Chase. *Iron Age,* v. 170, Nov. 27, 1952, p. 117-119.

Air gages play an important part in insuring quick and precise measurements of engine components in Ford's Cleveland plant. The latest type of dynamic crankshaft-balancing equipment is used. (S14)

10-S. Gear Measuring Equipment Used by the Bureau of Ships, U. S. Navy. John W. Sawyer. *Journal of the American Society of Naval Engineers,* v. 64, Nov. 1952, p. 719-731.

Instruments now used for gear inspection at the Naval Boiler and Turbine Laboratory, Philadelphia,

and the Engineering Experiment Station, Annapolis. (S14)

11-S. Determination of Oxygen in Iron in the Presence of Sulphur by the Vacuum-Fusion Method. H. L. Hammer and R. M. Fowler. *Journal of Metals,* v. 4, Dec. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 194, Dec. 1952, p. 1313-1315.

Ways of overcoming various difficulties encountered at Union Carbide and Carbon Research Laboratories, Inc. (S11)

12-S. A Versatile Equipment for Thermocouple Switching Using a Post Office Type Uniselector. H. Burton and S. F. Suffolk. *Journal of Scientific Instruments,* v. 29, Nov. 1952, p. 350-352.

Errors encountered in use, and methods of overcoming these errors. Details of a switching unit to connect up to 50 thermocouples in succession to either an indicator or a recorder. Diagrams and graphs. (S16)

13-S. Black Light Spots Defects in Materials. N. E. Walters. *Materials & Methods,* v. 36, Nov. 1952, p. 105-107.

Nondestructive inspection of metals and nonmetals by fluorescent methods. (S13)

14-S. Standard Carbon Steels; Chemical Composition Limits. *Metal Progress,* v. 62, Nov. 1952, p. 96B.

A data sheet. (S22, CN)

15-S. Magnetic Particle Weld Inspection. Gilbert C. Close. *Modern Machine Shop,* v. 25, Dec. 1952, p. 150-152, 154, 156, 158, 160, 162, 164.

Certain principles of the process and how they may be utilized to detect defects in ordinary fusion welds in ferrous materials. Diagrams and photographs. (S13, Fe)

16-S. The Push Button Era Has Reached Gaging. C. W. Kennedy. *Modern Machine Shop,* v. 25, Dec. 1952, p. 198-202, 204, 206, 208, 210, 212, 214.

Operation and advantages of automatic gages in checking parts. (S14)

17-S. (French.) **Metallographic Determination of Temperatures Reached During Operation of Heat Engines.** Jean Poulignier, Charlotte Buckle, and Pierre Jacquet. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Oct. 6, 1952, p. 718-720.

Operating temperatures on the surface and in interiors are deduced from colored films forming on the surfaces of Ni-Cr turbo-reactor blades. Results are compared with those deduced from hardness tests. Possibilities of more general application are indicted. Diagrams. (S16)

18-S. (French.) **The Principal French AFNOR Specifications for Finished and Semi-Finished Aluminum and Light Alloy Products.** *Revue de l'Aluminium,* v. 29, Oct. 1952, p. 375-377.

A list of the specifications. (S22, Al, Mg)

19-S. New System Speeds Construction of Gaging Set-Ups for Any Gaging or Scribing Operation. *Machine and Tool Blue Book,* v. 48, Dec. 1952, p. 170-172, 174, 178, 180, 182, 184-185.

A new series of gaging items developed by DoAll Co., Des Plaines, Ill., which permit more flexibility of gaging setups. (S14)

20-S. Drill Pipe Rejects Show Good Service Life. H. G. Texter. *Petroleum Engineer,* v. 24, Dec. 1952, p. B78, B81-B84, B86-B87.

Three experimental field tests. Results showed what depth or shape of inside seams can be tolerated. Micrographs. (S21, ST)

21-S. An Electrical Roughness Tester for the Workshop. G. W. van Santen. *Philips Technical Review,* v. 14, Sept.-Oct. 1952, p. 80-86.

Instrument consists of two pickups, one amplifier, a rectifier, and a moving-coil meter. (S15)

22-S. Some Practical Aspects of Specifying Surface Finishes. Joseph Adiletta. *Product Engineering,* v. 23, Dec. 1952, p. 150-154.

Typical surface conditions of parts prepared by various machining methods and standard designations for them. (S15, G17)

23-S. Vacuum Testing on Production Lines. Lorance E. Sterns. *Tool Engineer,* v. 29, Dec. 1952, p. 60-62.

Equipment for testing tightness of castings, drawn parts, assemblies, etc., using Whittington vacuum producers. Photographs and diagrams. (S general)

24-S. Concentration Tests on Various Base-Metal Ores. A. L. Engel. *U. S. Bureau of Mines,* Report of Investigations 4927, Nov. 1952, 14 pages.

Results of preliminary concentration tests on sample of ore containing the base metals Pb, Zn, Cu, or Sb or more than one of these metals. Tables. (S11, B14, Pb, Sn, Cu, Sb)

25-S. (German.) **Sampling Liquid Steel Baths for Oxygen.** Karl Georg Speith and Hans vom Ende. *Stahl und Eisen,* v. 72, Nov. 20, 1952, p. 1521-1523.

Report No. 515 of the Steelworks Committee of the Verein Deutscher Eisenhüttenleute. Method and results of tests. Photographs, tables, and charts. 11 ref. (S16, ST)

26-S. (Book.) **ASTM Standards on Metallic Electrical Conductors.** 252 pages. Sept. 1952. American Society

for Testing Materials, 1916 Race St., Philadelphia, Pa.

Conductors for use in uninsulated form or for subsequent use in making insulated conductors. Cu and Cu alloys, Cu-coated steel, Al, and iron and steel are included. (S22, Cu, Al, Fe, ST)

27-S Non-Destructive Testing. O. Vaupel. *Iron and Steel,* v. 25, Dec. 1952, p. 529-532, 534.

Standardization of X-ray and magnetic testing in Germany. (S13)

28-S. Industrial Fluoroscopy, the 1952 Mehl Lecture. D. T. O'Connor. *Non Destructive Testing,* v. 11, Fall, 1952, p. 11-22.

Value of X-ray testing to industry. Historical background, and a theoretical treatment of the subject. Graphs and fluorographs. 30 ref. (S13)

29-S. Modern Techniques in High-Voltage Radiography. E. Alfred Burrill. *Non Destructive Testing,* v. 11, Fall, 1952, p. 23-27.

Characteristics and economic status. Graphs. (S13)

30-S. Various Penetrameter Types and Their Limitations. Norman C. Miller and Gerold H. Tenney. *Non Destructive Testing,* v. 11, Fall, 1952, p. 28-32.

Theoretical and experimental aspects of X-ray penetration measurements for determining the resolution or sensitivity of the radiographic inspection procedure. (S13)

31-S. Iridium 192 in Industrial Radiography. J. V. Rigbey and C. F. Baxter. *Non Destructive Testing,* v. 11, Fall, 1952, p. 34-40.

Advantages and disadvantages of above over other gamma sources. Radiographs. (S13, Ir)

32-S. A Metals Comparator for the Inspection and Classification of Metals. B. M. Smith. *Non Destructive Testing,* v. 11, Fall, 1952, p. 41-46.

Instrument compares metal parts to a standard, thus maintaining quality control on such characteristics as composition, heat treatment, hardness or surface defects. Provided with either a test head or test coil, it can be used on metal parts of various shapes and sizes. (S general, Q29)

33-S. Temperature Measurement-Control. R. L. Nichols. *Petroleum Refiner,* v. 31, Dec. 1952, p. 104-106.

Types of measuring devices, thermal systems, mechanical thermometers, application of resistance thermometers, thermocouples, and pyrometers. (S16)

34-S. Optical Gaging Comes Out of the Toolroom. George H. DeGroat. *American Machinist,* v. 97, Jan. 5, 1953, p. 125-140.

Variety of production applications of comparators. Short-run, "on-the-floor" inspection, as well as large-volume quality-control operations and special comparator setups at machines. Photographs. (S14)

35-S. Rapid Analysis of Hydrogen in Molten Steel by Vacuum Fusion Method. Yoshio Ishihara and Shigeki Sawa. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 247-255.

A rapid analytical method for hydrogen in steel involving vacuum fusion of steel sample and subsequent measurement of thermoconductivity of the extracted gas. Applications of apparatus in practice. Tables and charts. (S11, ST)

36-S. High Temperature Thermal Analysis Using the Tungsten-Molybdenum Thermocouple. H. T. Greenaway, S. T. M. Johnstone and Marion K. McQuillan. *Industrial Heating,* v. 19, Dec. 1952, p. 2270, 2272, 2274, 2276, 2278, 2280.

Equipment involved and the technique employed in measuring temperatures up to 2000° C. High-frequency induction heating is used, and temperature is measured by means of a W-Mo thermocouple, for which a calibration curve is given. (S16, W, Mo)

37-S. Inspection Techniques for Quality Welding (Concluded.). William B. Bunn. *Industry & Welding,* v. 26, Jan. 1953, p. 48-49, 51-52, 70-71.

Magnetic particle, dye penetrant, and ultrasonic methods of inspection. (S13, K general)

38-S. Automatic Pipe Tester Cuts Inspection Costs. J. B. Delaney. *Iron Age,* v. 171, Jan. 8, 1953, p. 104-105.

Construction and performance of hydrastic tester for pressure tightness. Photographs. (S general)

39-S. Surface Temperatures. R. B. Sims and J. A. Place. *Iron & Steel,* v. 25, Dec. 12, 1952, p. 553-558.

New pyrometer for stationary and moving surfaces. (S16)

40-S. The Quick-Immersion Thermocouple for Liquid Steel. Review of Present-Day Techniques With Practical and Theoretical Studies. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 387-402.

Includes papers: "Review of Present-Day Immersion Pyrometry Techniques", D. Manterfield and J. D. Cresswell; "A Theoretical Study of the Response of Quick-Immersion Thermocouple", H. Herne; and "Laboratory Experiments on the Rate of Heating of the Quick-Immersion

Thermocouple", J. D. Cresswell. Tables and graphs. (S16, ST)

41-S. Routine Calibration of Precious-Metal Thermocouples at the Palladium Point. E. J. Knowles and R. C. Jewell. *Journal of the Iron and Steel Institute,* v. 172, Dec. 1952, p. 409-412.

Technique for determining e.m.f. of a precious-metal thermocouple at melting point of Pd. Simplification of this technique by differential method, which gives equal accuracy. Factors affecting accuracy of calibration. Diagrams. (S16, Pd)

42-S. Ultrasonics in Engineering. Frank H. Slade. *Machinery Lloyd* (Overseas Ed.), v. 24, Dec. 20, 1952, p. 69-78.

How ultrasonics are used in inspection of materials by nondestructive techniques to determine position and extent of internal defects, and to produce a change in physical or chemical state of materials during processing. (S13)

43-S. Which Method to Evaluate Surface Roughness? Irwin Goldman. *Materials & Methods,* v. 36, Dec. 1952, p. 89-93.

Numerous methods of measuring surface roughness. Advantages of binocular microscope. (S15)

44-S. Standard Commercial Wrought Copper and Brasses, Nonleaded and Leaded. *Metal Progress,* v. 62, Dec. 1952, p. 96-B.

Data sheet mechanical properties; fabrication processes and properties. (S22, G general, Cu)

45-S. Unsuspected Defects Found Ultrasonically. Frank C. Parker. *Welding Engineer,* v. 38, Jan. 1953, p. 26-27, 54-55.

Types of defects, present and future standards, and pipe inspection program. (S13)

46-S. Ultrasonics for the Metalworker. Frank Charity. *Western Machinery and Steel World,* v. 43, Dec. 1952, p. 85-88, 137.

Use for inspection and analysis. Photographs and diagrams. (S13, S11)

47-S. Polarographic Determination of Tin in Tin Plating Solutions. Rafael Diaz. *Plating,* v. 40, Jan. 1953, p. 45-46.

Merit of above analytical control method and procedure. (S11, L17, Sn)

48-S. Influence of Strain Gradient on Brittle Coating Sensitivity. A. J. Durelli and S. Okubo. *Product Engineering,* v. 24, Jan. 1953, p. 136-137.

Developments in study of influence of strain gradient perpendicular to the crack on the failure of the coating. (S13)

49-S. Recording and Indicating Instruments for Temperature Measurements Down to 10° K. Using Copper-Constantan Thermocouples. E. Victor Larson and Robert Mayer. *Review of Scientific Instruments,* v. 23, Dec. 1952, p. 692-694.

Modifications and additions to a standard instrument involved in solution of problems encountered in indicating and recording temperatures as low as 10° K. with CC thermocouples as primary elements. Diagrams and photographs. (S16)

50-S. (French.) **A Process Permitting the Elimination of Parasite Waves in Ultrasonic Testing of Metallic Specimens.** Louis Braujard. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences,* v. 235, Oct. 13, 1952, p. 804-806.

Experiments show that spurious harmonics are due to surface waves directly from transmitter to receiver. Proposes a photographic integration process eliminating these echoes. (S13)

51-S. (German.) **Testing Spring Steels by Means of F. Förster's Flaw Detecting Device.** Kurt Mathesius and Harro Bentke. *Stahl und Eisen,* v. 72, Dec. 4, 1952, p. 1587-1591, disc., p. 1591-1595.

Design, operation, sensitivity, and influences of several variables such as cathode ray brightness and direction of magnetization. (S13, ST)

52-S. Gaugemeter for Strip Mills. R. B. Sims. *Engineering,* v. 175, Jan. 9, 1953, p. 33-35.

Accurate and relatively inexpensive gage meter eliminates previous problems encountered in measuring thickness of rolled strip. Theory and industrial use. Disadvantages. Diagrams and graphs. (S14)

53-S. Ultrasonic Testing Used for Small-Diameter Tubing. Andrew J. Pardus. *Iron Age,* v. 171, Jan. 29, 1953, p. 110-113.

Procedures and equipment were developed by which ultrasonics can be applied successfully to locate flaws in small-diameter steel tubing. High-frequency pulsating sound waves sent into tubing locate flaws by reflecting from defect. Best results are obtained with a 1-megacycle, 1-in. quartz crystal, angle searching unit. Photographs. (S13, ST)

54-S. Gamma Ray Radiography. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 3, 1953, p. 79, 81, 83.

Methods and applications of γ-ray equipment for nondestructive testing in plants rather than in laboratories. (S13)

55-S. The Testing of Anodic Coatings. *Metal Industry,* v. 82, Jan. 2, 1952, p. 11-13.

Method for determining thickness by breakdown voltage. (S14, L19, Al)

56-S. How You Can Specify Surface Finishes. *Steel,* v. 132, Jan. 19, 1953, p. 74-78.

Standard terminology used by Yale & Towne Mfg. Co., for clearer understanding of surface finish specifications. Photographs and diagrams. (S15)

57-S. (English.) **Temperature Measurement During Heat Treatment of Aluminum.** A. v. Zeerleder. *Aluminium Suisse,* v. 2, Nov. 1952, p. 200-202.

Construction, application, and advantages of thermo-electric measuring devices. (S16, J general, Al)

58-S. (German.) **Electromagnetic Alternating-Field Processes for Nondestructive Testing of Iron Materials.** *Archiv fur das Eisenhuttenwesen,* v. 23, Nov.-Dec. 1952, p. 443-448.

By determining apparent change of resistance of a coil through which an alternating current flows and which magnetizes the parts to be tested, it is possible to separate these parts according to their composition, heat treatment, and hardness. Welding electrodes can be separated according to weldability. (S10)

59-S. (French.) **Utilization of X-Rays and Gamma Rays in the Inspection of Generator Parts.** P. Ruault. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 34, 19 pages.

Absorption of X-rays and γ-rays; different sources of radiation; diffused radiations; factors in the detection of defects; radiographic emulsion; and protection of working personnel. Photographs and tables. (S13)

60-S. Thermal Conductivity Method for Analysis of Hydrogen in Steel. Bruce M. Shields, John Chipman, and Nicholas J. Grant. *Journal of Metals,* v. 5, sec. 1, Feb. 1953; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 197, 1953, p. 180-184.

Vacuum Sn-fusion method of analysis for H_2 was modified to permit analysis of evolved gases for H_2 by means of a thermal conductivity cell. Tables. 15 ref. (S11, ST)

61-S. A Special Thermocouple for Measuring Transient Temperatures. David Bendersky. *Mechanical Engineering,* v. 75, Feb. 1953, p. 117-121.

Special thermocouple having a junction thickness of 1 micron, which is of such rugged construction that it may be employed to measure extremely rapid temperature changes in regions of high stress. Employs Ni and steel contacts. Diagrams, graphs, and micrographs. (S16, ST, Ni)

62-S. Heating Tube Failures. Cause and Prevention. John J. B. Rutherford. *Petroleum Processing,* v. 8, Jan. 1953, p. 62-69.

Material properties; furnace design; selection of materials, including carbon steel and Mo-Ni steel; service and inspection; and failures from mechanical and chemical causes. Micrographs and graphs. 11 ref. (S21, Q general, CN, AY)

63-S. Testing Brightens Profit Picture. W. E. Thomas. *Steel,* v. 132, Feb. 2, 1953, p. 104-108, 110.

Advantages of nondestructive testing and when in the processes it is advisable to use it. Photographs, tables, and diagrams. (S13)

64-S. Close Checks Produce Top Tool Steels. Leonard C. Grimshaw. *Steel,* v. 132, Feb. 9, 1953, p. 102, 104, 107.

Control measures in all phases of toolsteel production including spectrographic analysis, temperature controls, ultrasonic testing of billets and forgings, and magnetic testing. (S11, S13, S16, TS)

65-S. Radiochemistry and Germanium. George H. Morrison. *Sylvania Technologist,* v. 6, Jan. 1953, p. 17-20.

Use of radioactivity in research. Experiments in Ge purification. Photographs. (S19, Ge)

66-S. Radiography in a Clyde Shipyard. E. J. Duffy. *Transactions of the Institution of Engineers & Shipbuilders in Scotland,* v. 96, 1952-53, p. 34-64.

Recent developments in field of radiographic inspection based on availability of artificially created radioactive isotopes. Comparison between results obtained using X-rays and gamma rays, with particular reference to plate thickness of ½ to 1½ in. (S13, S19, CN)

67-S. (French and German.) **Nondestructive Materials Testing With Synthetic Radioactive Isotopes.** Hans Stäger. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 42, Oct. 1952, p. 193-201; Nov. 1952, p. 219-229; Dec. 1952, p. 238-244.

Production and selection of radioactive isotopes; destructive and nondestructive testing; flow chart on testing, tabulated survey of nondestructive testing methods, table of synthetic radioactive isotopes, and diagrams; use of Ir^{192}, Ta^{182}, and Co^{60} for nondestructive testing; practical application to testing welds; testing of large diameter tubes, welded vessels, wheels, and centrifuge baskets. (S13, S19)

68-S. Ultrasonic Inspection of Thin Metallic Sheet or Plate. R. Wilson. *Sheet Metal Industries,* v. 30, Feb. 1953, p. 146-160.

Recently developed method particularly applicable to sheet or material of relatively thin cross section. Graphs, diagrams, and micrographs. 10 ref. (S13)

69-S. (Book—German and French.) (Nondestructive Testing.) Zerstörungsfreie Werkstoffprüfung. Institut für Metallforschung. 166 pages. 1952. Verlag Stahleisen, Dusseldorf, Germany.

A symposium consisting of 9 papers in German and 11 papers in French. X-ray, γ-ray, ultrasonic, magnetic, and electrical test methods are discussed. (S13)

70-S. Non-Destructive Testing Reveals Casting Defects. J. M. Anspach. *American Machinist,* v. 97, Mar. 2, 1953, p. 117-124.

Use of each method and relative cost. Photographs and diagrams. (S13)

71-S. Spark Testing of Tool Steels. J. Lomas. *British Steelmaker,* v. 19, Feb. 1953, p. 86-89.

Method of sorting toolsteels. Primarily used for steels of different chemical compositions. (S10, TS)

72-S. Open-Hearth Bath Temperature Measurement. F. S. Swaney. *Instruments,* v. 26, Feb. 1953, p. 256-258, 288, 290.

Development of a light easily assembled thermocouple for open-hearth use. Operational results. Diagrams and photographs. (S16, D2)

73-S. New Detector Locates Tramp Metal in Iron Ore. W. H. Schwedes and C. W. Clapp. *Iron Age,* v. 171, Feb. 26, 1953, p. 140-141.

Detector can distinguish differences in structure between tramp metal and ore regardless of magnetic properties. Diagrams. (S10)

74-S. Ultrasonic Examinations of Weldments and the Establishment of Safe Acceptable Limits for Defects. Frank C. Parker. *Nondestructive Testing,* v. 11, Jan. 1953, p. 12-20.

Incipient cracks and defects which may become interconnected during operation because of shock, vibration, or thermal changes; and those not apparent by radiography but which may be detected through ultrasonic examination. Micrographs and photographs. (S13)

75-S. Quality Control Applications of Nondestructive Tests in the Airframe Industries Which Will Effectively Lower Production Costs. B. W. Clawson. *Nondestructive Testing,* v. 11, Jan. 1953, p. 25-27.

Nondestructive testing as it is currently being utilized and expanded within a specific airframe manufacturing installation. (S13)

76-S. Ultrasonic Testing of Cast Iron Pipe. G. B. Baumeister. *Nondestructive Testing,* v. 11, Jan. 1953, p. 28-29.

General discussion of inspection methods. Photographs. (S13, CI)

77-S. Commercial Interpretation of Magnetic Particle Tests Correlated With Radiography and Physical Tests. A. F. Cota and J. J. Chyle. *Nondestructive Testing,* v. 11, Jan. 1953, p. 34-40.

Testing program includes inspection by means of radiographic, magnetic particle, penetrant, ultrasonic, hydrostatic, ionization, thermal, and visual methods to anticipate permissible loading of the product. The tests and equipment used. Photographs and diagrams. (S13)

78-S. The Whys and Wherefores of Statistical Quality Control. Wade R. Weaver. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 462-465.

Fundamental reasons why any industry, and foundry industry in particular, can and should avail itself of potential advantages offered by quality control. (S12)

79-S. Foundry Management Looks at Statistical Quality Control. E. L. Fay. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 511-516.

The value to foundry manager in controlling and increasing quality, in reduction of scrap and salvage costs, and in indirect and secondary benefits to be derived. Several fundamental steps in setting up a successful quality control program, and some of its results. Photographs and graphs. (S12, E general)

80-S. Quality Control Program for a Steel Jobbing Foundry. H. H. Fairfield. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 536-538.

Brief description. Photographs and tables. (S12, E general, CI)

81-S. Quality Control in a Malleable Iron Foundry. E. F. Price and O. K. Hunsaker. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 655-664; disc., p. 664-665.

Principles of quality control, control of raw materials, melting control, coremaking, molding operations, annealing control, soft iron control, and finishing department control. Graphs. (S12, E general, CI)

82-S. A Solidification Dilatometer and Its Application to Gray Iron. R. P. Dunphy and W. S. Pellini. *Transactions of the American Foundrymen's Society,* v. 60, 1952, p. 783-788; disc., p. 788.

Features of solidification, metal movement, and dimensional changes of simple systems. Diagrams and graphs. (S16, P10, CI)

83-S. Report of Committee 4 on Rail. C. J. Code, chairman. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1175-1264.

Consists of 12 papers relating to failure and defects of rails. (S21, CN)

84-S. Investigation of Failures in Control-Cooled Railroad Rails. R. E. Cramer. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1186-1193.

Examples of various rail failures and their analysis at University of Illinois. Macro and micrographs. (S21, CN)

85-S. Rail Failure Statistics, Covering (a) All Failures; (b) Transverse Fissures; (c) Performance of Control-Cooled Rail. C. J. Code, chairman. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1194-1211.

Extensive tabulated information. (S21, CN)

86-S. Service Tests of Various Types of Joint Bars. T. A. Blair, chairman. *American Railway Engineering Association Bulletin,* v. 54. Feb. 1953, p. 1213-1221.

Graphical interpretation. (S21, CN)

87-S. Eleventh Progress Report of the Rolling-Load Tests of Joint Bars. R. S. Jensen. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1223-1237.

Testing machines, test specimens, results of rolling-load tests, hardness tests on joint bars, and rolling-load tests of oil-quenched and tempered bars. Data from 85 bars that failed in service are given. Photographs, micrographs, and tables. (S21, Q26, CN)

88-S. Service Tests on the Burlington Railroad Near Fort Morgan, Colo. of Joint Bars of Different Metallurgies. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1237-1239. (S21, CN)

89-S. Eleventh Progress Report on Shelly Rail Studies at the University of Illinois. R. E. Cramer. *American Railway Engineering Association Bulletin,* v. 54, Feb. 1953, p. 1243-1249.

Repeat test on heat treated rail, completion of tests of flame hardened rails, rolling-load tests of commercially flame-hardened rails, rolling-load tests to develop detail fractures, and stress relief of specimen during rolling-load tests. Tables and photographs. (S21, Q26, CN)

90-S. Standard Specifications for Leaded Nickel-Brass (Leaded Nickel-Silver) and Leaded Nickel-Bronze (Leaded Nickel-Silver) Sand Castings. *Foundry,* v. 81, Mar. 1953, p. 219-220.

Tabulated information of ASTM Designation. B 149-52. (S22, E11, Cu)

91-S. Effect of Lubricant on Gear Performance. V. N. Borsoff and S. S. Sorem. *Iron and Steel Engineer,* v. 30, Feb. 1953, p. 83-88; disc., p. 88.

Gear failures; mechanical methods and lubrication as factors in improving gear performance; research with radioactive tracers. Micrographs and graphs. 12 ref. (S21, Q9, S19)

92-S. American Standard Specifications for Cast Iron Pipe Centrifugally Cast in Metal Molds, for Water or Other Liquids. *Journal American Water Works Association,* v. 45, Feb. 1953, p. 189-206.

Consists of ASA specifications A21.6-1953 (AWWA C106-53). Extensive tables. (S22, E14, CI)

93-S. American Standard Specifications for Cast Iron Pipe Centrifugally Cast in Sand-Lined Molds, for Water or Other Liquids. *Journal American Water Works Association,* v. 45, Feb. 1953, p. 207-230.

Consists of ASA specifications A21.8-1953 (AWWA C108-53) Tables and diagrams. (S22, E14, CI)

94-S. Some Methods of Measuring Surface Topography as Applied to Stretcher-Strain Markings on Metal Sheet. W. H. L. Hooper. *Journal of the Institute of Metals,* v. 81, Feb. 1953, p. 161-165.

Two techniques for measuring surface topography of sheet metal showing strain markings. Talysurf surface-measuring instrument, and light-interference effects are used. Macrographs. (S15, CN, Al)

95-S. (German.) Sampling Certain Lead and Zinc-Containing Materials. Fritz Ensslin. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 5, Dec. 1952, p. 475-479.

Tested procedures for taking samples of various materials including Pb and Pb alloys; accumulator residues and Pb ashes; Pb blast furnace slags; metallic Zn and Zn alloys; Zn scrap and ash; and ammoniac slags. Diagrams. (S12, Pb, Zn)

96-S. (German.) Surface Testing With Micro-Interferences. A New Surface Interferometer. Rudolf Landwehr. *Zeitschrift für Angewandte Physik,* v. 4, Oct. 1952, p. 377-386.

Describes and diagrams apparatus. Reflecting and control surfaces are extended and moved under a microscope along with the speci-

men. Examples of application. 31 ref. (S15)

97-S. (Japanese.) Ultrasonic Method for Nondestructive Inspection. Noboru Takagi and Noboru Niwa. *Journal of N.D.I.*, v. 1, Autumn, 1952, p. 13-16.

Classifies various methods and briefly describes an ultrasonic detector. (S13)

98-S. (Japanese.) The Present Situation of X-Ray Inspection Units in Japan. Yoshio Komai. *Journal of N.D.I.*, v. 1, Autumn, 1952, p. 24-28.

Classifies and describes high-voltage circuit systems of units. Emphasizes improvements made on self-rectifying system. Diagrams. (S13)

99-S. Sonic Energy. Industry's New Production and Inspection Tool. Carroll W. Boyce. *Factory Management and Maintenance,* v. 111, Mar. 1953, p. 84-95.

How sonic energy can inspect, clean, measure, precipitate, and emulsify. Defines sonic energy and describes equipment for its production. Photographs. (S13, S14, L10)

100-S. Magnetic Particle Production Inspection. Gilbert C. Close. *Finish*, v. 10, Mar. 1953, p. 32-33, 37, 96.

Stresses importance of inspection standards and describes procedures. Photographs. (S13)

101-S. Standard Commercial Wrought Tin and Aluminum Brasses, Bronzes, and Nickel Silvers. Arthur H. Allen. *Metal Progress,* v. 63, Feb. 1953. p. 96-B.

Extensive table including composition, forms that can be ordered, range of mechanical properties, fabrication processes, and fabricating properties. (S22, Cu)

102-S. Various Methods of High Pressure Testing Oil Country Tubular Material. H. G. Texter. *Petroleum Engineer,* v. 25, Mar. 1953, p. B45-B48, B50-B51, B53-B54, B56-B58.

Advantages and disadvantages of field testing and testing at the mill. Various methods of sealing for mill testing. Photographs. (S21)

103-S. Statistical Quality Control in the Finishing Industry. Bryant W. Pocock. *Products Finishing,* v. 17, Mar. 1953, p. 22-32, 34.

Practical applications for controlling products. (S12, L general)

104-S. Conversion Table for the Most Frequently Used Sheet and Wire Gauges. *Pro-Metal,* Dec. 1952, p. 94-95.

Includes Standard (SWG); Birmingham (BG); American (AWG); U. S. Gov't. Standard; Stub's (BWG); Washburn & Moen (SWG); London/Old English; Manufacturers' for Sheet Steel; and Silesian (Galvanized). (S14)

105-S. Quality Control Aids in Steel Processing Control. Wade R. Weaver. *Blast Furnace and Steel Plant,* v. 41, Feb. 1953, p. 198-202, 223; Mar. 1953, p. 307-310.

Statistical techniques serve as an added tool to operations analyst. Process of setting up controls to reduce variations in ingot weight and quality. Graphs. (S12)

106-S. The Principles of Technical Control in Metallurgical Manufacture. A. R. E. Singer. *Journal of the Institute of Metals,* v. 81, Mar. 1953, p. 329-340.

Effects of economic and technical factors on the quality of manufactured products. Some aspects of statistical plant control in relation to present practice and probable future developments. Diagrams, graphs, and tables. (S12)

107-S. The Techniques, Applications, and Scope of Non-Destructive Testing in Industry. J. D. Hislop. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 69. Mar. 1953, p. 225-244.

Main methods of nondestructive testing (radiography, magnetic crack tection, ultrasonics, etc.); their scope and limitations. Economics of testing. Photographs. (S13)

108-S. Determination of Small Percentages of Boron in Heat Resisting Alloys and Alloy Steels. A. G. Komarovskii. Henry Brutcher Translation 2962, 6 pages. (From *Zavodskaia Laboratoriia,* v. 16, no. 10, 1950, p. 1228-1230.)

Quantitative spectrographic method. Procedure for preparing standards and specimens. (S11, B, AY)

109-S. Ultrasonic Testing of Heavy Steel Forgings by the Pulse-Echo Technique. R. Schinn and U. Wolff. Henry Brutcher Translation 2964, 17 pages.

Previously abstracted from *Stahl und Eisen.* See item 352-S, 1952. (S13, ST)

110-S. Gas-Sampling Equipment for the Supervision of the Working of the Blast Furnace. W. Loorz. Henry Brutcher Translation 2998, 8 pages.

Previously abstracted from *Stahl und Eisen.* See item 548-S, 1952. (S11, D1, Fe)

111-S. (French.) Simultaneous Determination of Iron and Aluminum in Zinc for Galvanizing. V. H. Hardy. *Métaux Corrosion-Industries,* v. 27, Dec. 1952, p. 515-518.

Describes a spectro-photometric method. Tables and graphs. (S11, L16, Fe, Al, Zn)

112-S. Volumetric Determination of Aluminum in Copper-Base Alloys by

Fluoride Method. Jorma Kinnumen and Bengt Merikanto. *Chemist Analyst,* v. 42, Mar. 1953, p. 16-17.

Procedure and results.
(S11, Al, Cu)

113-S. Lowered Production Costs Through the Use of Dy-Chek or Spek-Chek. Gordon Rice. *Nondestructive Testing,* v. 11, Mar. 1953, p. 16-22.

Development, field performance, evaluation, and use in inspection. Photographs. (S13)

114-S. The Brown Boveri 31-Million Volt Dual Beam Betatrom. R. Wideroe. *Nondestructive Testing,* v. 11, Mar. 1953, p. 23-27.

Operating principles and applications to material testing. Diagrams and photographs. (S13)

115-S. Reduction of Exposure Time in Gamma Radiography. J. J. Hirschfield and D. T. O'Conner. *Nondestructive Testing,* v. 11, Mar. 1953, p. 28-33.

Technique used to reduce exposure time. Graphs and radiographs. (S13)

116-S. Uses of Low Voltage X-Ray Tubes With Thin Beryllium Windows in Nondestructive Testing. T. H. Rogers. *Nondestructive Testing,* v. 11, Mar. 1953, p. 34-39.

Advantages over Al windows. Diagrams and graphs. 21 ref. (S13)

117-S. What Causes Car Journals to Burn Off? J. J. Laudig. *Railway Locomotives and Cars,* v. 127, Apr. 1953, p. 69-73.

Experiments showed that journal failures can be attributed to Cu penetration from the bronze shell through surface of the steel journal. Suggested solutions to the problem. Photographs. (S21, Cu, ST)

118-S. (French.) Nondestructive Analysis of Ancient Metal Objects. Georges Ambrosino and Pierre Pindrus. *Revue de Métallurgie,* v. 50, Feb. 1953, p. 136-138.

Qualitative and quantitative analysis of alloys using neutrons and gamma rays. Tables. (S11)

119-S. (German.) Rapid Testing Procedures for Separating Steels. Ewald Baerlecken. *Stahl und Eisen,* v. 73, Jan. 1, 1953, p. 30-34.

Chemical and magnetic-inductivity tests. Diagrams. 32 ref. (S10, ST)

120-S. Instrumentation and Nonferrous Metal Fabrication. *Canadian Metals,* v. 16, Mar. 1953, p. 40, 42, 44.

How instrumentation is used in the casting shop and in rod, tube, and sheet mills.
(S18, S16, E general, F23, EG-a)

121-S. Quantitative Analysis by X-Ray Fluorescence. Application to Alloy Systems. E. Gillam. *Metal Treatment and Drop Forging,* v. 20, Mar. 1953, p. 99-102.

Results of a systematic study for determining possibilities and limitations of the method for rapid works analysis of alloy steels. Conclusions can apply generally to all metal mixtures and solutions. Graphs. (S11)

122-S. Brittle Structural Failures With Emphasis on Welded Ships. J. O. Almen. *Product Engineering,* v. 24, Apr. 1953, p. 192-203.

Season cracking of shell cases, stress-corrosion cracking of Mg, stress-corrosion failures in steel, residual stress from cold forming, cracking of cold formed members, piston pin retainer failures, grinding cracks, welding failures, residual stress from flame cutting, prestressing with hammer blows, hammer peening of soft steel, and dissection stress analysis. Photographs and graphs. 15 ref.
(S21, Q23, R1, G23, Mg, ST, CN)

123-S. The Detection of Peel on White-Heart Malleable Iron Track Links by a Non-Destructive Test. "Strength & Testing of Materials". v. 6. Part II. Testing Methods and Test results. 1952. p. 121-124.

Testing by localized electrical resistance measurements. The electrical method gives useful indication of the presence or absence of peel. (S13)

124-S. (German.) Detection of Cr in Malleable Cast Iron. R. Leo and Gertrud Brylka. *Chemische Technik,* v. 4, Sept. 1952, p. 402-404.

Various aspects of diphenylcarbazide process. (S11, CI)

125-S. (Book.) Practical Spectroscopy. Theodore A. Cutting. 220 pages. 1952. William Heinemann Ltd., London, England.

Written as an aid for analyzing ores, minerals, alloys, and inorganic chemicals. (S11)

126-S. High-Temperature Immersion Thermocouples. E. T. Myskowski and H. F. Bishop. *American Foundryman,* v. 23, Apr. 1953, p. 150-155.

Use of thermocouples for molten metals above 2100° F. Refinements in technique, and precautions which should be observed for maximum accuracy. Photographs. (S16)

127-S. Radiographic Inspection Assures Good Welds on Providence Distribution Line. Leslie S. Fletcher. *Gas Age,* v. 111, Apr. 9, 1953, p. 45-47.

Technique based on Co^{60} which provides simple and dependable

method for inspecting welds in the field. Photographs. (S13, K9)

128-S. Some Metallurgical Applications of Ultrasonics. Alan E. Crawford. *Metallurgia,* v. 47, Mar. 1953, p. 109-113.

Factors governing design of ultrasonic generators for metallurgical applications, and ways in which ultrasonics can be used, particularly in the foundry. Diagrams, photographs, and graphs. 9 ref. (S13)

129-S. Electronic Measurement of Surface Coating Thickness. *Product Finishing,* v. 6, Mar. 1953, p. 47-50.

Circuit and method of operation of a typical instrument for detecting pinholes in paint and other coatings. (S14)

130-S. Radioactive Materials in Finishing Research. *Product Finishing,* v. 6, Mar. 1953, p. 56-63.

Application in electroplating, vitreous enameling, paint, coating research, and corrosion studies. (S19, L general, R11)

131-S. Mathematical Determination of the Thickness of Coatings on Wires of Round Cross Section. Anton Zastera. *Draht* (English Ed.), Mar. 1953, p. 48-49.

Formulas for determination. Graphs. (S14)

132-S. (English.) **The Polarographic Determination of Small Amounts of Tin in Zinc Die Casting Alloys.** Alfreds J. Sietnieks. *Acta Chemica Scandinavica,* v. 6, no. 8, 1952, p. 1217-1222.

Experimental data. (S11, Sn, Zn)

133-S. (French.) **Ultrasonic Inspection of Semi-Finished Products.** M. Hetzler and A. Michalski. *Revue de Métallurgie,* v. 50, Jan. 1953, p. 1-12.

Inspection of rolled and forged pieces, defect classification, structure effects, and comparison with acid testing. (S13)

134-S. (French.) **Automatic Control.** Tavernier. *Circulaire d'Informations Techniques,* v. 10, no. 2, 1953, p. 303-309; disc., p. 309-310.

Various types of automatic regulating equipment used in the iron and steel mill. (S18, D general)

135-S. X-Ray Fluoroscopy Analyzes Alloys. Ruben M. Brissey and George A. Chase. *American Machinist,* v. 97, Apr. 27, 1953, p. 132-133.

Instrument which qualitatively and quantitatively analyzes high-temperature alloys and stainless steel. (S11, SG-h, SS)

136-S. Nuclear Radiation. Its Detection and Measurement. Ernest H. Wakefield. *ASTM Bulletin,* Apr. 1953, p. 33-38.

Characteristics of six types of nuclear radiation, advantages and disadvantages of eight types of instruments for detecting and counting, and kinds of electronic circuitry associated with the instruments. Diagrams and photographs. (S19)

137-S. Quality Control in Steel Production. *Canadian Metals,* v. 16, Apr. 1953, p. 22, 24.

Instrumentation is used to control variables in production of high-quality steels for high-speed, drill, and tool work. (S12)

138-S. Radiographic Thickness Measurement. *Canadian Metals,* v. 16, Apr. 1953, p. 43.

Method for rapid measurement in production of strip and sheet metal. (S14)

139-S. Gamma Radiography for Non-Destructive Testing. E. G. Fritz. *Canadian Metals,* v. 16, Apr. 1953, p. 56, 58.

Use of radioactive sources in radiographic metal inspection. (S13)

140-S. Steel Industry Water Instrumentation. Charles F. Hauck and Edward C. Eger. *Instruments,* v. 26, Apr. 1953, p. 569-571, 596, 598, 600.

In treatment, use, and disposal of water in the steel industry, instruments can reduce operating and supervisory labor requirements, minimize treating-chemical requirements, insure uniformly better-quality water, and protect water-using equipment. Points in the water system where instruments should be employed. Tables and diagram. (S18, ST)

141-S. Identification Marking of Blooms, Billets, and Slabs. Charles C. Hill, Jr. *Iron and Steel Engineer,* v. 30, Apr. 1953, p. 73-79; disc., p. 79.

Methods of marking commonly used in the steel industry. (S10, ST)

142-S. Control of Strip Thickness in Cold Rolling by Varying the Applied Tensions. R. B. Sims, J. A. Place, and P. R. A. Briggs. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 343-354.

Performance of the prototype closed-loop controllers demonstrates that the gage of rolled strip may be controlled by automatically varying strip tension, depending on error signal from the mill load. Diagrams and graphs. 10 ref. (S14, F23)

143-S. Works Trial of the 'T' Method of Automatic Gauge Control. R. B. Sims, J. A. Place, and P. R. A.

Briggs. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 354-360.

Actual performance showed that the control methods worked satisfactorily on a production mill at high speeds without instability developing and without producing strip of poor shape. Photographs and diagrams. (S14, F23)

144-S. Narrow-Side Vertical Cracking in Ten-Ton Ingot Moulds. A. Jackson and A. N. Whiting. *Iron and Steel Institute, Journal,* v. 173, Apr. 1953, p. 360-362.

Annealing and strapping methods as means of preventing cracks. (S21, D9, J23, CI)

145-S. Specifications Relating to Aluminium and Magnesium. *Light Metals,* v. 16, Apr. 1953, p. 121-125.

New and revised specifications for alloys and many fabricated products. (S22, Al, Mg)

146-S. Determining Gas in Aluminium Melts. *Light Metals,* v. 16, Apr. 1953, p. 130.

Method and applications. (S11, Al)

147-S. Stability of a Bimetallic Disk. Part I. W. H. Wittrick. **Part II.** W. H. Wittrick, D. M. Myers, and W. R. Blunden. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 6, Mar. 1953, p. 15-31.

General theory of deformation is developed and applied to the case of a disk initially in the form of a spherical cap. Expression is derived for the mean temperature which a disk of this type will maintain when used as the control element of a thermostat. Results are obtained for the temperature variation about this mean value. Diagrams and tables. (S16)

148-S. Control of Heat Treating Furnaces Improves Quality. Leo Walter. *Steel Processing,* v. 39, Apr. 1953, p. 177-181, 190.

Basic factors in temperature control, modes of furnace control, control theory, furnace types, and control methods. Diagrams and photographs. (S16, J general)

149-S. The Soviet Tool Industry. Measuring and Inspection Equipment. J. Mannin. *Engineers' Digest,* v. 14, Apr. 1953, p. 123-127.

Examples illustrate Soviet developments in precision indicators of various types, recording equipment for dimensional control, testing machines for special measuring tasks, and automatic inspection machinery. Diagrams. (S general)

150-S. 150-kV X-Ray Equipment for the Radiography of Circumferential Welds in Gas-Turbine Rotors. F. W. Waterton. *Institution of Electrical Engineers, Proceedings,* v. 100, Pt. II, Apr. 1953, p. 105-112; disc., 112-114.

Design, construction, and test results of a 150-kV 50-c/s continuously evacuated X-ray equipment. It was built to replace radium-bomb method for radiography of circumferential welds in a hollow fabricated drum or pipe in which the interior was not accessible for insertion of cassettes using an external source of radiation. Diagrams, photographs, and graphs. (S13)

151-S. Advanced Inspection Equipment Insures Close Tolerances. Charles H. Wick. *Machinery* (American), v. 59, Apr. 1953, p. 151-156.

Equipment used to inspect parts for De Soto Fire Dome V-8 engines. Photographs. (S14)

152-S. Aircraft Materials. G. M. Hutt. *Metal Industry,* v. 82, Apr. 17, 1953, p. 308.

Changes in the new Numerical and Classified List of D.T.D. Aircraft Material Specifications. (S22, T24)

153-S. Standards Ease Selection and Use of Carbide Tool Materials. H. H. Miller. *Metal Progress,* v. 63, Apr. 1953, p. 75-81.

Development of standards for producing sintered carbides based on chemical composition, hardness, specific gravity, transverse rupture strength, porosity, and microstructure. Carbides include W-Co, W-Co-Ta-Cb, W-Co-Ta-Ti-Cb, W-Co-Ta, W-Co-Ti, and W-Co-Ta-Ti. Typical applications. Tables and micrographs. (S22, T6, SG-j, W, C-n)

154-S. Boron and Tentative Standard Steels. *Metal Progress,* v. 63, Apr. 1953, p. 96B.

Tabulated information on composition. Issued by American Iron and Steel Institute, Feb. 1953. (S22, AY)

155-S. Experimenting at High Pressures. D. M. Newitt and K. E. Bett. *Nature,* v. 171, Apr. 18, 1953, p. 668-669.

Possibilities and limitations of testing techniques. (S18)

156-S. (Book.) **ASTM Standards on Light Metals and Alloys.** 205 pages. Mar. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Specifications for Al and Al-base alloys as ingots, castings, bars, rods, wire, forgings, pipe, tubes, wrought products for electrical purposes, filler metal, and electroplating. For

Mg and Mg-base alloys specifications are given for ingots, castings, bars, rods, forgings, sheet, and tubes. Also gives general methods of testing. (S22, Al, Mg)

157-S. (Book.) **Ferrous Analysis. Modern Practice and Theory.** Rev. Ed. 2. E. C. Pigott. 690 pages. Chapman and Hall Ltd., 37 Essex St., London, W.C.2, England. 84s net.

Describes 31 quantitative methods for different elemental constituents of iron and steel. Absorptiometric, spectrophotometric, and spectrographic techniques are covered, and there is a section on microchemical analysis. Other sections give modern procedure for analysis of ferro-alloys, iron ores, and refractories. (S11, Fe)

158-S. (Book.) **Radioisotopes in Industry.** John R. Bradford, editor. 309 pages. 1953. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $8.00.

Includes "Radioisotopes: A New Industry", T. Keith Glennan; "Radioisotopes for Industry", Paul C. Aebersold; "Fundamentals of Radiochemistry", John R. Bradford; "Radiation Protection", Otto Glasser; "Radioisotopes in Physical and Chemical Research", G. D. Calking; "Applications of Radioisotope Techniques", Charles Rosenblum; "Radiochemical Laboratories", Thomas B. Lanahan; "Design of Laboratories for Safe Use of Radioisotopes", Donald R. Ward; "Production and Separation of Radioisotopes", A. F. Rupp; "Tracer Experiments", Rex Fluharty; "Instrumentation in the Radiochemical Laboratory", V. L. Parsegian; "Decontamination and the Disposal of Radioactive Wastes", C. C. Ruchhoft; "Industrial Uses of Radioactive Fission Products", Paul M. Cook, William E. Hosken, and Paul J. Lovewell; and "Distribution of Radioisotopes by the Atomic Energy Commission", S. Allan Lough. (S19)

159-S. (Book.) **Spectrographic Analysis of Low-Alloy Steels. B.I.S.R.A. Special Report 47.** Iron and Steel Institute, 4 Grosvenor Gardens, London, S.W.1, England. 15s.

Method is applicable to analysis of low-alloy steels with an Fe content of 95% ± 1%. Elements which may be determined are Si, Mn, Ni, Cr, Mo, V, and Cu. (S11, AY)

160-S. Measurement of Steel Bath Temperature. R. D. Hindson and J. P. Orton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 143-145.

Discusses advantages gained through methods of bath pyrometry. (S16, D2)

161-S. Measurement of Bath Temperatures in the Open Hearth. D. J. Carney and J. J. Oravec. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 145-151.

Desirability of using thermocouple pyrometers. Tables. 7 ref. (S16, D2)

162-S. Measurement of Steel Bath Temperature. Oscar Pearson and F. B. Coffman. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 152-161.

Methods, applications, and results of spoon immersion method. Graphs, diagrams, and tables. (S16, D2)

163-S. Measurement of Open Hearth Bath Temperature. J. R. Brady. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 162-165; disc., p. 165.

Modification of immersion process. Diagrams and graphs. (S16, D2)

164-S. Methods and Advantages of Temperature Control. Francis H. Hohn. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 35, 1952, p. 202-210; disc., p. 211-212.

Procedure and results. Graphs and photographs. (S16, D2)

165-S. (English.) **Alizarin Blue as a Reagent for Traces of Copper.** F. Feigl and A. Caldas. *Analytica Chemica Acta,* v. 8, no. 2, Feb. 1953, p. 117-121.

A test which detects Cu to a limit of 0.0025 by a spot reaction. A blue, acid resistant, inner complex is formed. 4 ref. (S11, Cu)

166-S. (English.) **Paper Chromatography of Inorganic Ions. V. The Preparation of Carrier-Free Isotopes by Paper Chromatography.** M. Lederer. *Analytica Chemica Acta,* v. 8, no. 2, Feb. 1953, p. 134-139.

Above was used to separate the following carrier-free radio-isotopes: Na-Mg, Rh-Fe, Pd-Rh, Co-Fe, Zn-Cu, and U-Pa. Diagrams. 13 ref. (S11, Na, Mg, Rh, Fe, Pd, Co, Zn, Cu, U, Pa)

167-S. (French.) **Separation of Scandium From Lanthanum and Yttrium.** P. Radhakrishna. *Analytica Chemica Acta,* v. 8, no. 2, Feb. 1953, p. 140-145.

Use of a resin ion exchange column and an eluent of citric acid at different pH levels. The hysteresis phenomenon of Sc is also treated. Diagrams. 4 ref. (S11, La, Sc, Y)

168-S. Automatic Machine Assembles, Inspects Small Parts. J. J. Obrzut. *Iron Age,* v. 171, May 7, 1953, p. 236-238.

Use of a special-purpose machine to automatically assemble airhorn assemblies of carburetors. Safety devices are used throughout machine. Failure of operator, machine, or assembly automatically stops the machine. Photographs. (S18, A5)

169-S. You Can Get Better Case Depth Measurements. A. D. Kirshenbaum and H. C. Boynton. *Iron Age,* v. 171, May 14, 1953, p. 138-140.

Use of isotopes such as C^{14} and Co^{60} to measure depth of C absorption in case hardened 1020 steel. Micrographs. (S19, J28, CN)

170-S. Chemical Compositions of SAE Carbon Steels. *Machine and Tool Blue Book,* v. 49, May 1953, p. 235, 237, 239.

Tabulated information on various steels. (S22, CN)

171-S. Statistical Quality Control. Watchdog of Ford Finishes. Frank L. Bonem. *Products Finishing,* v. 17, May 1953, p. 22-32, 34.

Relates application of statistical quality control to finishing operations performed in the Dearborn assembly plant. (S12)

172-S. An Automatic Controller for Radiofrequency Induction-Heating Units. J. J. Theron. *Review of Scientific Instruments,* v. 24, Apr. 1953, p. 281-282.

Simple, rugged, and adaptable device for regulating power provided by an industrial rf generator for induction heating. Regulation of temperature within ±½° at 1000° C. was achieved where system is not disturbed in any way. (S16, J2)

173-S. X-Ray Gaging Irons Out Strip Variables. B. H. McGar. *Steel,* v. 132, May 18, 1953, p. 110.

Electronic gaging of Cu alloy strip. (S14, Cu)

174-S. (French.) Automatic Regulation. A. Liebaut. *Flamme et Thermique,* v. 6, no. 54, Mar. 1953, p. 33-42.

Treats control, accuracy, sensitivity, precision, and compensation of the above mathematically; includes types of adjustment. Graphs, diagrams. (To be continued.) (S16)

175-S. Production Inspection X-Ray. David Goodman. *Aero Digest,* v. 66, May 1953, p. 22-25.

Inspection of Al, Mg, and steel castings used in aircraft. Photographs. (S11, Al, Mg, CI)

176-S. The Sampling of Pig and Cast Iron for Carbon Determination. W. E. Clarke. *British Cast Iron Research Association Journal of Research and Development,* v. 4, Apr. 1953, p. 496-519.

Sampling flake graphite materials. Results showed that difficulties of obtaining a representative sample for C determination depend not so much on the total C content as on the size and distribution of the graphite. Micrographs, tables. (S11, CI)

177-S. The Scope and Future of Isotope Utilization. Paul C. Aebersold and Edwin A. Wiggin. *Journal of Chemical Education,* v. 30, May 1953, p. 229-234.

History of radioactivity, use of isotopic materials for analysis, and training chemists in handling and using radioisotopes. (S11)

178-S. Automatic Metal Gauging Using X-Rays. John F. Howell. *National Electronics Conference, Proceedings,* v. 8, 1952, p. 121-126.

A noncontacting X-ray gage using two CdS cells for determining thickness of metal parts. Diagrams, photographs. 4 ref. (S14)

179-S. Non-Destructive Nuclear Measurements of Waveguide Plating Thickness. H. V. Watts, C. A. Stone, and L. Reiffel. *National Electronics Conference, Proceedings,* v. 8, 1952, p. 134-143.

Technique based on thermal neutron activation, where Ag, Cu, and Zn are made radioactive and measured by a thin-window Geiger counter. Prototype instrument using this principle is capable of handling straight sections of guide up to 3 ft. in length complete with flanges. Tables, photographs. (S14, Ag, Cu, Zn)

180-S. The Vacuum Fusion Technique as Applied to the Analysis of Gases in Metals. R. A. Yeaton. *Vacuum,* v. 2, Apr. 1952, p. 115-124.

Present state of this technique. Diagrams. 47 ref. (S11)

181-S. Material Evaluation. Andrew LaCorte. *Wire and Wire Products,* v. 28, May 1953, p. 478, 504.

Slide control device designed to evaluate and predetermine the end result of a known rod chemical analysis before drawing. (S11, CN)

182-S. (French.) Polarographic and Spectrographic Identification of Cadmium in Iron and Steel Products. Emile Jaudon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 11, Mar. 16, 1953, p. 1166-1167.

2 references. (S11, Cd)

183-S. (French.) **Physical Chemistry. Separation of Niobium and Tantalum by Chromatography on Activated Alumina.** Nicolas Tikhomiroff. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences.* v. 236, no. 12, Mar. 23, 1953, p. 1263-1265.
2 references. (S11, Ta, Nb)

184-S. (French.) **Separation of Na^{22} From Magnesium Target by Electrolysis on a Renewed Mercury Cathode.** Marius Chemla and Jules Pauly. *Société Chimique de France, Bulletin,* no. 4, Apr. 1953, p. 432.
Concludes that the above is an easy and satisfactory method. Graph, diagram. 7 ref. (S11, Na, Mg)

185-S. (German.) **Standardization of Technical Surfaces.** Willy Schenkel and Walter Schmidt. *Metalloberfläche,* v. 7, ser. A, no. 1, Jan. 1953, p. A1-A6.
DIN standard specimens were examined. Surface measurements were explained and compared with foreign standards. Symbolic representation of roughness is discussed. Tables, diagrams. (S22, S15)

186-S. (German.) **Surface Measurement With Keyed Cutting Apparatus.** Walter Schmidt. *Metalloverfläche,* v. 7, ser. A, no. 3, Mar. 1953, p. A33-A38.
Surveys available machinery. Discusses DIN (German Industrial Norm) numbers. Graphs, photographs. (S15)

187-S. (German.) **Interference Colors in Electrolytically Separated, Thin Metallic Films.** Artur Kutzelnigg. *Metalloberfläche,* v. 7, ser. B, no. 3, Mar. 1953, p. B39-B40.
Use of interference colors as the simplest method of analyzing metallic layers with relatively low atomic weights. (S15)

188-S. (German.) **Nondestructive Electronic Classifying of Metals According to Their Physical Properties.** F. Forster. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 57-66.
Theoretical basis for numerous electronic and magnetic testing devices now in use. Graphs, diagrams. (S13)

189-S. (German.) **Ultrasonic Testing of Weld Seams.** Hans Krächter. *Stahl und Eisen,* v. 73, no. 5, Feb. 26, 1953, p. 279-283.
Ultrasonic test heads were used to detect cracks, pores, and inclusions in welds up to 45 mm. thick. Results were compared by using γ and α-radiation tests. (S13, K9)

190-S. (German.) **Determination of Boron in Alumininum-Boron Alloys.** E. Eipeltauer and G. Jangg. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 18-29.
B content as low as 0.3% was detected by separating Al with NaOH. (S11, B)

191-S. (German.) **Determination of Aluminium as Oxyquinolate.** Karl Ernst Stumpf. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 30-41.
Describes methods based on precipitation from homogeneous solution. Tables. (S11, Al)

192-S. (German.) **Determination of Phosphorus as Quinolin-Phosphomolybdate in Swedish Iron Ores.** Uno Fernlund, Sepp Zechner, and Thyr Andersson. *Zeitschrift für Analytische Chemie,* v. 138, no. 1, 1953, p. 41-44.
New method in which P is precipitated as quinolinphosphomolybdate and then determined volumetrically. (S11, Fe)

193-S. (German.) **Influence of Iron on Polarographic Analysis.** R. Geyer. *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 271, no. 1-2, Dec. 1952, p. 93-100.
By reducing trivalent Fe with hydrazine sulfate, hindering effect of large amounts of Fe^{+++} were eliminated. Important steel-alloying elements, Cu, Mo, and V were detected in presence of each other. Graphs. (S11, Fe, Cu, Mo, V)

194-S. **How to Specify Iron Water Pipe.** Howard F. Rase. *Chemical Engineering,* v. 60, June 1953, p. 242-243.
Various specifications and how to use them. (S22, CI)

195-S. **Open-Hearth-Furnace Bath Temperature Pyrometry.** L. H. Veiock. *Instruments,* v. 26, May 1953, p. 722-723, 754.
Immersion thermocouple system, radiation immersion units, recorders, and users' opinions on both types of units. Diagrams. (S16, D2)

196-S. **Fluoroscopic Inspection Provides Rapid Check of Aircraft Alloy Castings.** Justin G. Schneeman. *Western Metals,* v. 11, May 1953, p. 59-61.
Inspection of Al and Mg castings. Photographs. (S13, Al, Mg, AY)

197-S. (French.) **Flame Spectra of the Rare Earths.** Maurice Pinta. *Journal des Recherches du Centre National de la Recherche Scientifique,* no. 21, Dec. 1952, p. 260-270.
Flame spectra of Ce series, Sc, Y, and La. A possibility of spectrophotometric analysis of these elements is suggested from this study. (S11, EG-g)

198-S. (German.) **Fundamentals of Modern Statistical Evaluative Proced-**

ures Relative to Sampling. Hans Klein. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 11-20.

Graphs and tables. 5 ref. (S12)

199-S. (German.) **Ultrasonic Testing of Rolls and Steel Flasks.** Hugo Josef Seemann and Werner Bentz. *Archiv fur das Eisenhuttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 47-52.

Tests were carried out with a SCAM device. Describes combined ultrasonic and echo process used to test steel flasks for highly compressed gases. Photographs, diagrams. 4 ref. (S13, ST)

200-S. (Book.) **Analysis of Aluminum Alloys.** G. H. Osborn and W. Stross. 144 p. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y. $3.50.

Survey of analytical methods, including new, standard, and modifications of standard procedures. Methods range from those requiring modern physicochemical instruments, such as polarograph and photometer, to those which may be carried out with normal laboratory equipment. Methods for determination of Be, Bi, Ca, Ag, and Na are described. (S11, Al)

201-S. (Book.) **Bibliography on X-Ray Stress Analysis With Subject Index. Ed. 2.** Herbert R. Isenburger. 17 p. 1953. St. John X-Ray Laboratory, Califon, N. J.

In addition to the bibliography, there is material on the X-ray method and a subject index. (S general)

202-S. (Book.) **Precision Measurement in the Metal Working Industry. Dept. of Education of International Business Machines.** 365 pages. 1952. Syracuse University Press. $6.00.

Chapters deal with line-graduated instruments; precision gage blocks; plug, ring, snap thread, and dial gages; test indicators; micrometers; verniers; surface plates and accessories; angle-measuring instruments, comparators; optical instruments and surface finish measurement; measuring machines; hardness testers ; and non-destructive testing methods. (S general, Q29)

203-S. Tin Assay Shortcut Speeds Control. C. Goldberg. *Iron Age,* v. 171, May 28, 1953, p. 130-131.

A faster method for determining tin content in brasses and bronzes for control work. (S11, Cu, Sn)

204-S. The Magnetic Amplifier and Its Application in the Steel Industry. W. E. Miller. *Iron and Steel Engineer,* v. 30, May 1953, p. 65-75; disc., p. 75-79.

Principles of operation and application of this form of regulating equipment. Future possibilities. Diagrams, photographs. (S18, D general)

205-S. Gravimetric Determination of Sulphur in Basic Steelmaking Slags. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 28-30.

Development of a standard procedure. Tables. (S11, B18, ST)

206-S. Ultrasonic Equipment for High-Precision Thickness Measurement. Peter K. Bloch. *Nondestructive Testing,* v. 11, May 1953, p. 21-23.

Refinements in equipment and technique which have made it possible to obtain thickness measurements within ½% of actual dimensions with ultrasonic resonance instruments. (S14)

207-S. Industrial Evaluation of Search Coil Flaw Detection Techniques. C. H. Hastings and G. A. Darcy. *Nondestructive Testing,* v. 11, May 1953, p. 24-29.

Basic techniques and additional experience in the use of a search coil technique for magnetic flaw detection. Photographs, diagrams. (S13)

208-S. Industrial Application of Eddy Current Testing. William A. Cannon, Jr. *Nondestructive Testing,* v. 11, May 1953, p. 30-33.

Equipment and conditions under which it is used. Photographs. (S13, P16)

209-S. Optical Gaging for Economical Inspection of Sinterings. *Precision Metal Molding,* v. 11, Apr. 1953, p. 51-52.

Technique compared with mechanical gaging. (S14)

210-S. Control of Metallurgical Standards. W. J. Harris, Jr. *Standardization,* v. 24, May 1953, p. 132-136.

Need for integrating and standardizing research findings. Photographs. (S22)

211-S. One Bad Weld Paid Cost of Inspection. Leslie S. Fletcher. *Welding Engineer,* v. 38, June 1953, p. 50-52.

Facilities for inspecting pipes for underwater use. Economy is emphasized. Photographs. (S13, K9, CN)

212-S. (French.) **Applied Radioactivity. A Technique of Determining Tantalum in Ferroniobium and Niobium Ores.** Andre Kohn. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences,* v. 236, no. 14, Apr. 8, 1953, p. 1419-1421.

Method of analyzing Ta with no chemical separation of above. Activity of samples and standards is compared after irradiation in a slow neutron flux. Ta content may be determined within 5%. 2 ref. (S19, S10, Ta, Cb)

213-S. (French.) **Commission for the Study of Metallic Construction (C.E.C.M.).** Francois Perot. *Ossature Metallique*, v. 18, no. 4, Apr. 1953, p. 231-242.

A joint committee sponsored by the "Federation de l'Industrie des Fabrications Metalliques", the "Groupement de Hauts Fourneaux et Acieries Belges", and the "Groupement des Industries Sideurgiques Luxembourgeoises". Summarizes work done on the classification and standardization of Belgian structural steels. Diagrams. (S22, ST)

214-S. (German.) **A Simple Process for Detremining Thickness of Sn Coat on Pb Sheet.** Gerhard Schikorr. *Metalloberfläche*, v. 7, ser. B, no. 1, Jan. 1953, p. B8-B9.

Use of $(NH_4)_2S$. Process is applicable to tin plate. (S14, Sn, Pb, CN)

215-S. **New Limit System Proposed for Metalworking.** F. W. M. Lee. *American Machinist*, v. 97, June 8, 1953, p. 137-141.

Standardization of limits into an easily memorized unilateral system saves gaging costs. (S14)

216-S. **Techniques of Temperature Control.** S. D. Ross. *Consulting Engineer*, v. 2, May 1953, p. 42-45.

Sensing devices, control in open and closed vessels, limit control, and program control. Diagrams. (S16)

217-S. **Neutron Detectors for Reactor Instrumentation.** T. A. J. Jaques, H. A. Ballinger, and F. Wade. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. I, May 1953, p. 110-116; disc., p. 116-120.

Principles involved in the detection of thermal neutrons. Describes three types of detector used in the operation of natural-uranium graphite-moderated reactors. Tables, diagrams. 7 ref. (S19, U)

218-S. **Sampling and Testing Titanium.** Robert B. Stanton. *Modern Machine Shop*, v. 26, June 1953, p. 136-138.

Practical receiving inspection and sampling procedure developed for Ti bars, sheets, and strips. (S12, Ti)

219-S. **Gaging Broaches by Optical Projection.** B. G. Lawrence. *Modern Machine Shop*, v. 26, June 1953, p. 196-198.

Shows that optical gaging now makes possible the checking of all teeth of broaches for tooth form, spacing, and wear for the entire length of a broach. Photographs. (S14)

220-S. **Phase and Intensity Measurements for Some Aluminum Films.** Kozo Ishiguro and Goro Kuwabara. *Optical Society of America, Journal*, v. 43, May 1953, p. 365-367.

Made with a modified "Rayleigh Lowe Interferometer". (S15, Al)

221-S. **How to Cut Weld Inspection Time.** Alexander Gobus. *Petroleum Engineer*, v. 25, June 1953, p. C21, C24.

New inspection method permits radiography of hot welds without cooling and reheating cycles. Diagrams. (S13, K9)

222-S. **Transmission of Co^{60} Gamma Rays Through Thick Uranium.** L. H. Lanzl, L. S. Skaggs, J. H. Pingel, and J. E. Rose. *Review of Scientific Instruments*, v. 24, May 1953, p. 394.

Measurements. (S19, Co)

223-S. **Increased Sensitivity of Leak Detection With Hydrogen.** George A. Alers, James A. Jacobs, and Philip R. Malmberg. *Review of Scientific Instruments*, v. 24, May 1953, p. 399-400.

Techniques. (S13)

224-S. **Behavior of Two Types of Thermocouples Under Pile Irradiation at Low Temperatures.** R. E. Jamison and T. H. Blewitt. *Review of Scientific Instruments*, v. 24, June 1953, p. 474.

Account of tests made at Oak Ridge. (S16)

225-S. (German.) **Quick Analysis of Steels, Aluminum, and Copper Alloys With Metal Spectroscope.** K. D. Mielenz. *Metall*, v. 7, nos. 7-8, Apr. 1953, p. 256-260.

Evaluation of above process and compares it with other methods. Early development and basis of spectral analysis. (S11, Fe, Al, Cu)

226-S. (German.) **Testing Rail Welds by Ultrasonics.** W. Lehfeldt. *Schweissen und Schneiden*, v. 5, no. 3, Mar. 1953, p. 110-112.

Principles and methods of using such test instruments. Photographs, diagrams. (S13)

227-S. (German.) **Development of Weighing Apparatus for Iron and Steel Industry.** Kurt Rosenbaum. *Stahl und Eisen*, v. 73, no. 9, Apr. 23, 1953, p. 573-574.

New devices and their costs. Emphasizes methods for speeding up weighing procedures. Photographs. (S12)

228-S. (German.) **Frequency Determinations on Analytical Deviations of Turnings and Remelted Pigs of AlCuMg.** August Buckeley. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 3, Mar. 1953, p. 87-91.

Deviations from research results were noted from frequency curves

set up after double analysis. Most deviations are due to differences in sampling and analyzing. (S12, Al, Cu, Mg)

229-S. **Profile-Projector.** *Aircraft Production,* v. 15, June 1953, p. 222-223.

Instrument used to inspect turbine blades and die profiles. Diagram, photograph. (S14)

230-S. **Castings and Ultrasonic Testing.** *Foundry Trade Journal,* v. 94, May 28, 1953, p. 611-612.

Application to testing, difficulties with castings, and apparatus. (S13, CI)

231-S. **Micro-Inch Inspection in the Timken Gage Laboratory.** Michael C. Curtis. *Machinery* (American), v. 59, June 1953, p. 180-186.

Surface inspection equipment. Illustrations. (S14)

232-S. **Weight of Blue-Tempered Spring Steels, Per Lineal Foot.** Alfred L. Snape, compiler. *Machinery* (American), v. 59, June 1953, p. 259.

Tabulated data. (S22, ST)

233-S. **Statistical Aspects of Specifications.** H. H. Johnson. *Mechanical Engineering,* v. 75, June 1953, p. 447-450.

Application of control charts to any dimensional control of forgings or castings. Affords a factual picture of process performance and capability. Information as to the justification for specification tolerances. Graphs. (S22, S12)

234-S. **Tolerances and Specifications for Aluminum and Magnesium Castings.** W. D. Stewart. *Mechanical Engineering,* v. 75, June 1953, p. 450-455.

Problem of establishing a sequence of solidification so that the change in unit volume on solidification can be compensated for satisfactorily. Permanent mold and sand casting processes. Diagrams, tables. 6 ref. (S22, E general, Al, Mg)

235-S. **Tolerances and Specifications for Precision Investment Castings.** W. O. Sweeny. *Mechanical Engineering,* v. 75, June 1953, p. 456-457, 471.

Problems and commercial limitations of precision casting process. How tolerances affect cost. Diagrams. (S22, E15)

236-S. **A Recent Development in Measuring Flame Hardening Temperatures.** *Metal Treating,* v. 4, May-June 1953, p. 8-9, 34.

Describes the "Milliscope" which measures radiation in the infrared range. Photographs. (S19, J2)

237-S. **Specification for Ductile Iron.** George Sorkin. *Steel,* v. 132, sec. 1, June 22, 1953, p. 86-87.

Bureau of Ships specification that requires low-phosphorus raw materials and a ferritizing anneal to give material with highest uniformity. (S22, J23, CI)

238-S. **Production Testing Goes for a Spin.** George W. Ehrsam, Jr. *Steel,* v. 132, June 15, 1953, p. 92-94.

Advantages of spin testing before machining. Photographs. (S21)

239-S. **Instrumentation Assures Accurate Heat Treating.** A. W. Boecker. *Steel Processing,* v. 39, June 1953, p. 277-278, 302-303.

Specialized equipment and techniques used for annealing, hardening, nitriding, stress relieving, and carburizing. Photographs. (S16, S18, J general)

240-S. **Determination of Hydrogen in Zirconium by the Hot Vacuum Extraction Method.** R. K. McGeary. Paper from Zirconium and Zirconium Alloys, p. 168-175. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Glass vacuum apparatus used for rapid and precise H_2 determinations. Tables. (S11, Zr)

241-S. (French.) **Modern Methods of Controlling the Quality of Light Alloys Before Use.** E. G. Laffly. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 199, 201-203.

Degassing and spectrographic analysis as tools for controlling casting quality. (S11, E general)

242-S. (German.) **Testing of Forged Machine Parts.** R. Schinn. *Brennstoff-Wärme-Kraft,* v. 5, no. 4, Apr. 1953, p. 132.

Testing with ultrasonic frequencies and the betatron. DVM rapid test for heat resistance was found unreliable. 10 ref. (S13)

243-S. (German.) **Nondestructive Materials Testing in Boiler Systems.** W. Kolb. *Brennstoff-Wärme-Kraft,* v. 5, no. 4, Apr. 1953, p. 133.

Recent developments. (S general)

244-S. (German.) **Temperature Measurement in High-Temperature Furnaces.** K. Guthmann. *Chemie-Ingenieur-Technik,* v. 25, no. 4, Apr. 4, 1953, p. 169-176.

Measuring techniques, standardization completed thus far, and magnitude of errors of various methods. Methods and equipment are discussed in relation to range of applications. Graphs, diagrams. 8 ref. (S16)

245-S. (German.) **Nondestructive Thickness Measurement for Nonmetallic and Metallic Surface Layers.** F.

Forster. *Metall,* v. 7, nos. 9-10, May 1953, p. 320-324.

Measurement of nonconducting layers of nonferrous metals and unmagnetizable steels; thickness of nonferrous surface layers and base metals; precision layer measurements; measuring of Ni layers. Photographs, graphs, diagrams. 3 ref. (S14, Ni)

246-S. (German.) Testing and Controlling the Working Surfaces of Hollow Tools, Especially of Reducing Dies for the Production of Screws and of Drawing Dies Made of Sintered-Carbide Alloys. Werner Lueg. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 621-629.

Procedure and results of tests. Spherical mirrors made inner walls accessible for perpendicular viewing. Photographs, diagrams. 24 ref. (S15, C)

247-S. (German.) Design and Applications of Betatron Apparatus. Otto Vaupel. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 705-721.

Model with stepped-up radiation yield and radiation tests of welds with greater thicknesses. Photographs, graphs, diagrams. 27 ref. (S13)

248-S. (German.) Devices for Testing and Calibrating Flow Meters. *Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 13, May 1, 1953, p. 386-387.

Arrangements for testing and calibrating flow meters under various conditions. Graphs, diagrams, photographs. 6 ref. (S18)

249-S. (German.) New Methods for Studying Material Balance in a Nonferrous Metal Plant Explained by Using Examples From the Duisburger Copper Mine. Wilhelm Teworte. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 5, May 1953, p. 161-167.

Periodic control of products composition in a mining and smelting plant is shown to be desirable. Procedures of sampling, quantitative measurement, and analysis. Charts, photographs, diagrams, graphs. (S12)

250-S. (German.) Supersonic Material Testing of Light Metal Semifinished Industrial Products. Josef Krautkrämer and Walter Roth. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 198-205.

Practical application of supersonic test method on press and rolling blooms. Diagrams. 5 ref. (S13)

251-S. (Book.) Applied Inorganic Analysis. 2nd Edition. W. F. Hillebrand, G. E. Lundell, H. A. Bright, and J. L. Hoffman. 987 p. 1953. John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $15.00.

Emphasizes the separation and determination of metals and the treatment of minerals and rocks. (S11, C28, B14)

252-S. (Book.) Mechanical Inspection. W. H. Armstrong. 361 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $5.50.

Purpose is to aid in training of inexperienced men and women as inspectors in machine shops or related industries. Presented simply, it is meant primarily for use in classwork at technical institutes, vocational industrial schools, or industrial training classes. Contains sufficient detail to permit its use in self-instruction. (S general)

253-S. Construction of Filled Thermal Systems. *Canadian Chemical Processing,* v. 37, June 1953, p. 42-44, 64, 66.

Basic elements in a filled temperature control system and installation precautions. Diagrams. (S16, Cu, Pb, SS)

254-S. Surface Reactions of Steel in Dilute $Cr^{51}O_4$ Solution: Applications to Passivity. R. A. Powers and Norman Hackerman. *Electrochemical Society, Journal,* v. 100, July 1953, p. 314-319.

Interactions between a steel surface and anions containing Cr-VI were studied by radiotracer methods supplemented by contact potential measurements. (S19, R10, ST)

255-S. Precise Parts Sorting on Production Lines. Albert C. Sanford. *Electronics,* v. 26, July 1953, p. 142-145.

Electronic and electrical devices which inspect and measure parts on the assembly line and actuate the disposal units. Photographs, diagrams. (S14)

256-S. Pearlitic Malleable Castings. H. E. Steinhoff and Lyle Jenkins. *Foundry,* v. 81, July 1953, p. 84-87.

Shows that metallurgical and chemical controls and modern production methods improve product quality. Micrographs. (S general, E11, CI)

257-S. Aspects of Nuclear Fission of Interest to Foundrymen and Metallurgists. E. W. Colbeck. *Foundry Trade Journal,* v. 94, June 18, 1953, p. 697-706.

Nondestructive examination by radio-isotopes, their use as tracers in metallurgy, nuclear energy as source of power, and problems of constructional materials for atomic piles. Diagrams, photographs. 25 ref. (S19, T25)

258-S. Atlas. Steel Giant. Hugh C. McKinnon. *Instrumentation,* v. 6, 2nd qtr., 1953, p. 16-17.

Process control in high-quality steel plant. (S18, SS, TS)

259-S. Pyrometric Midgets. C. A. Volgelsang and J. D. Sine. *Instrumentation,* v. 6, 1st qtr., 1953, p. 33-36; 2nd qtr., 1953, p. 33-36.

Technique of selecting, installing, and maintaining thermocouples and extension wire. Diagrams, graphs, tables. 19 ref. (S16)

260-S. New Instrument for Roughness Measurement. A. F. Underwood and J. B. Bidwell. *Machine and Tool Blue Book,* v. 49, July 1953, p. 202-204, 206, 208-210, 212-215.

Instrument which is compact, easy to use, and extremely accurate. Diagrams, photographs. (S15)

261-S. Gamma-Ray Equipment for the Non-Destructive Examination of Casting and Welded Assemblies. *Machinery* (London), v. 82, June 19, 1953, p. 1148-1151.

Described and illustrated. (S13, E general, K general)

262-S. The Construction and Use of Mecalix Transducer Units. *Machinery* (London), v. 82, June 19, 1953, p. 1157-1161.

Unit which is used for measuring stresses and tolerances when machining. Photographs, diagrams. (S14, Q25)

263-S. Ultrasonic Measuring Instruments. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, June 1953, p. 69-71.

Means for direct measurement of wall thicknesses of nonferrous metals. Diagrams. (S14, EG-a)

264-S. Tolerances and Specifications of Gray-Iron Castings. C. O. Burgess. *Mechanical Engineering,* v. 75, July 1953, p. 547-549.

Considers specifications, as-cast tolerances, machine tolerances, and jig locations (S22, CI)

265-S. Flush Pin Gauges. *Mechanical World and Engineering Record,* v. 133, June 1953, p. 254-256.

Application will speed up the inspection of parts, particularly when the latter are produced by single spindle and multi-spindle automatics where a 100% check is demanded. (S14)

266-S. Standard Stainless Steels, Wrought and Cast. *Metal Progress,* v. 63, June 1953, p. 96B.

Tabulated information on compositions. (S22, SS)

267-S. Process Control in Gun Tube Manufacture. H. C. Dill and F. B. Stern, Jr. *Metal Progress,* v. 63, June 1953, p. 161-162.

Inspection program. (S18)

268-S. Radioisotopes in Metallurgy. *Metal Progress,* v. 63, June 1953, p. 186-188.

Digest of paper by H. R. Spedden presented at the Nuclear Science in Industry Session of the American Assoc. for the Advancement of Science, Dec. 29, 1952. Shows how isotopes are being used to study metallurgical problems. (S19)

269-S. Precautions With Precision Measurement. C. W. Kennedy. *Modern Machine Shop,* v. 26, July 1953, p. 180-182, 184, 186, 188, 190, 192, 194, 196, 198, 200.

Suggestions for use and care of precision gaging instruments. Photographs. (S14)

270-S. Measurement of Temperatures of Metal-Mould Interfaces. D. V. Atterton and D. H. Houseman. *Nature,* v. 171, May 30, 1953, p. 980-981.

Application of the method. (S16)

271-S. The Isotopic Constitution of Silicon, Germanium, and Hafnium. John H. Reynolds. *Physical Review,* v. 90, ser. 2, June 15, 1953, p. 1047-1049.

Techniques measuring the constitutions with a mass spectrometer. Compares results. Tables. 5 ref. (S19)

272-S. Through Research to Standards on Cast-Iron Pipe. Thomas H. Wiggin. *Standardization,* v. 24, June 1953, p. 168-170, 184.

Development of standards on cast-iron pipe in respect to reasons for failure, corrosion, and thickness necessary. Photographs. (S22, CI)

273-S. How You Can Control Temperatures in Induction Heating. *Steel,* v. 133, July 6, 1953, p. 149.

New instrument which can detect minute changes in radiation. Its use to control and record temperature in heating applications. (S16, J2)

274-S. Analysis of Maximum Temperatures in Workpieces. A. O. Schmidt. *Tool Engineer,* v. 31, July 1953, p. 53-58.

State of workpieces with respect to sensible heat. Temperature gradient in workpieces while being milled and the existence of very high instantaneous surface temperatures during the cut were determined experimentally. Diagrams, graphs, 12 ref. (S16, G17, CN)

275-S. The Hydrostatic and Hammer Tests Applied to Pressure Vessels. *Welding Journal,* v. 32, June 1953, p. 303s-304s.

Abstracted from a survey made by the Inspection and Testing Subcommittee, Fabrication Division, Pressure Vessel Research Committee Results of the survey. (S21)

276-S. (German.) **On Sampling During Metallurgical Testing.** Willy Oelsen. *Stahl und Eisen*, v. 73, no. 8, Apr. 8, 1953, p. 495-498.

Importance of knowing at all times just what reactions are occurring in the furnaces. 3 ref. (S12, D general)

277-S. **Simplification and Some Potentialities of High Strength Heat Resisting Alloys.** J. B. Meierdirks, Jr. *American Iron and Steel Institute, Regional Technical Meetings*, 1953, p. 425-455.

Simplified treatment of effects of alloying elements. Specifications of wrought and cast alloys. Tables, graphs. 32 ref. (S22, SG-h)

278-S. **Modern Magnetic Thickness Testers.** *Electroplating and Metal Spraying*, v. 6, July 1953, p. 249-253, 255.

Use of various magnetic instruments to measure coating thickness. Photographs. (S14, Ni, AY, CI)

279-S. **A Permanent-Magnet Crack Detector.** J. W. Walley. *Engineering*, v. 176, July 3, 1953, p. 5.

New apparatus for detecting transverse faults in ferrous components. Photographs. (S13)

280-S. **Deductive Methods for Testing Engineering Materials. I.-IV.** A. M. Armour. *Laboratory Practice*, v. 2, Apr. 1953, p. 175-179; May 1953, p. 236-240; June 1953, p. 306-312; July 1953, p. 368-371.

General discussion of nondestructive testing. Individual tests. Diagrams, photographs. (To be continued.) (S general)

281-S. **Ultrasonic Inspection Insures Dependable Jet-Engine Parts.** C. V. Garrett. *Machinery* (American), v. 59, July 1953, p. 194-201.

Method for observing transmission and reflection of high-frequency sound waves to determine internal defects in jet-engine parts. Photographs, diagrams. (S13)

282-S. **The Ultrasonel Flaw Detector.** *Railway Gazette*, v. 99, July 3, 1953, p. 17-18.

Equipment and its operation. Photographs. (S13)

283-S. **B.I.S.R.A. Profiloscope, an Inspection Tool for Wire Drawing Dies.** J. G. Wistreich. *Research*, v. 6, July 1953, p. 252-257.

Working principle and design of instrument. Diagrams, graphs. (S15, F28)

284-S. **Air Gaging. A Challenge and an Answer.** F. Meyer, Jr. *Steel*, v. 133, July 20, 1953, p. 108-110.

Air gage used for production inspection. Photographs, diagrams. (S14)

285-S. **Radioactive Tracers in Physical Metallurgy Research.** Michael B. Bever. "Modern Research Techniques in Physical Metallurgy." American Society for Metals, Cleveland, p. 278-311.

Principles, operation, and detection as applied to structural studies, diffusion measurements, and surface phenomena. (S19)

286-S. (English, Spanish.) **Measurement of Linear Dimensions Using Short Electromagnetic Waves.** *Machinery Lloyd (Overseas Ed.)*, v. 25, July 4, 1953, p. 77, 79.

Apparatus, function, operation, and measuring procedure. Diagram. (S14)

287-S. (Dutch.) **Nondestructive Testing Team ECA.** L. van Ouwerkerk. *Metalen*, v. 8, no. 3, Feb. 15, 1953, p. 44-50; no. 4, Feb. 28, 1953, p. 76-79; no. 5, Mar. 14, 1953, p. 98-101; no. 7, Apr. 15, 1953, p. 158-163.

Series of articles on methods of nondestructive testing. Photographs, graphs, diagrams. (S general)

288-S. (Dutch.) **Nondestructive Gravimetric Determination of Average Thickness of Electrolytic Deposits and Accuracy of Such Determination.** J. H. Zaat. *Metalen*, v. 8, no. 6, Mar. 31, 1953, p. 129-135.

Determines thickness mathematically from volume increase of an electroplated object. Tables, graphs. (S14, L17)

289-S. (Dutch.) **X-Ray Examination of Welds.** W. J. Kaufman. *Metalen*, v. 8, no. 9, May 15, 1953, p. 193-199.

Application of radiographic inspection in preproduction research, production inspection, quality control, acceptance inspection, and welder training. Tables. 18 ref. (S13, K9)

290-S. (French.) **Determination of Hydrogen in Liquid Steel.** M. Dauvergne. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 10, no. 5, 1953, p. 823-827.

Apparatus and method for continuous control of H. Advantages. Tables, photographs. (S11, ST)

291-S. (French.) **Small Electric Furnaces With Metallic Resistances Being Able to Function at High Temperature (up to 1350° C).** Erwin Pierre Jung. *Métaux, Corrosion-Industries*, v. 28, no. 331, Mar. 1953, p. 127-132.

Errors to avoid, electrical and mechanical set-up, design of heating elements, and regulation of temperature. (S16)

292-S. (Russian.) **Graphic Analytical Method for Computation of Symmetrically Loaded Circular Plates.** S. D.

Ponomarev. *Vestnik Mashinostroeniia,* v. 33, no. 2, Feb. 1953, p. 17-27.
Method can be applied to any load distribution for plates of constant and variable thickness. Graphs. 4 ref. (S14)

293-S. (Book.) Handbook of Cast Iron Pipe. Ed. 2. 444 p. 1952. Cast Iron Pipe Research Assn., 122 S. Michigan Ave., Chicago 3, Ill. $5.
Essential dimensions and specifications for pipe, and some descriptive background on foundry practice, history, design assumptions underlying the ASA specifications, and additional information about pipelaying, flow, etc. (S22, E general)

294-S. (Book.) Modern Mass Spectrometry. G. P. Barnard. 326 p. Institute of Physics, 47 Belgrave Sq., London, S.W.1, England. 50s net.
General theory of the instrument, positive ion sources, vacuum techniques, gas flow, and applications of it in physics, chemistry, engineering, hydrocarbon analysis, molecular structure, chemical kinetics, and isotopic tracer techniques in biochemistry, geology, and nuclear chemistry. (S11)

295-S. A Convenient Source of Gamma Radiation. Donald F. Saunders, Frederick F. Morehead, Jr., and Farrington Daniels. *American Chemical Society, Journal,* v. 75, July 5, 1953, p. 3096-3098.
Sealed assembly of two concentric Al tubes filled in between with Co powder and then irradiated in a pile to Co^{60}. (S19, Al, Co)

296-S. Examination of Flaws in Galvanized Domestic Hot Water Tanks. D. Caplan and P. J. Sereda. *Canadian Journal of Technology,* v. 31, July-Aug. 1953, p. 172-174.
Tests. Photographs. 3 ref. (S13, L16, Zn, CN)

297-S. A High-Temperature High-Vacuum Furnace for Experimental Work. H. D. Blakelock and C. F. Machin. *Engineer,* v. 196, July 17, 1953, p. 83-84.
Construction and performance of furnace. Diagram, photographs. 12 ref. (S16)

298-S. Designing an Accurate Immersion Thermocouple. R. E. Bish. *Foundry,* v. 81, Aug. 1953, p. 193, 244.
Thermocouple designed for checking metal temperature in small electric furnaces used in investment casting. (S16, E15)

299-S. Wide Range Metering of Oxygen in Steel Plants. Marshall S. Gare. *Iron and Steel Engineer,* v. 30, July 1953, p. 74-81; disc., p. 81-82.
Meter which provides accuracy at very low as well as at high flows. Diagrams. (S18)

300-S. Tooling Material Standardization. Fred M. Burt. *Machine and Tool Blue Book,* v. 49, Aug. 1953, p. 162-166, 168.
Toolsteels and their mechanical properties. (S22, Q general, TS)

301-S. Techniques Used in Measuring Uniformity of Materials With Gamma Radiation. John N. Harris and Lawrence R. Megill. *Nondestructive Testing,* v. 11, July 1953, p. 9-13.
Principles, collimation, detectors, mechanical equipment and calibration. Photographs, diagrams. (S19)

302-S. Magnetic Inspection in Aircraft Manufacture. Howard Southworth. *Nondestructive Testing,* v. 11, July 1953, p. 23-26.
Types of defects and importance of detection in raw materials, finished products and service conditions. Photographs. (S13)

303-S. Interpretation of Radiographs of Aluminum and Magnesium Castings. J. J. Pierce. *Nondestructive Testing,* v. 11, July 1953, p. 27-31.
Gas holes, gas porosity, shrinkage cavity, shrinkage sponge, microshrinkage, foreign material, hot cracks and cold shuts. Photographs, micrographs. 12 ref. (S13, Al, Mg)

304-S. New X-Ray Gauge Checks Tin Plate Thickness. Frederick A. Behr. *Nondestructive Testing,* v. 11, July 1953, p. 33-36.
Testing apparatus. Photographs, diagrams. (S14, Sn, CN)

305-S. Ultrasonic Inspection. Equipment Features. D. C. Erdman. *Oil and Gas Journal,* v. 52, Aug. 1953, p. 62, 66.
Improvements in the echo-type ultrasonic gage. (S14)

306-S. Measuring Temperature With Paint. *Organic Finishing,* v. 14, July 1953, p. 22-23.
German development where a system of "Thermocolors" shows temperature changes within ±9° F. over a range of 104 to 1832° F. Several applications and limitations. Photographs. (S16)

307-S. New Ultrasonic Test Method. Thomas A. Dickinson. *Steel Processing,* v. 39, July 1953, p. 327-329.
Apparatus and mechanism. Photographs, diagrams. (S13)

308-S. Elements of Statistical Quality Control. W. W. Kauffman. *Tool Engineer,* v. 31, Aug. 1953, p. 59-63.
Importance of variations and limits. Graphs. (S12)

309-S. Inspection Techniques for Quality Welding. Lew Gilbert and William B. Bunn. *Welding Journal,* v. 32, July 1953, p. 614-619.

Nondestructive testing and inspection of welds. Photographs. (S general, K9, CN)

310-S. (French.) **Extension of the International System of Measurements.** Eligio Perucca and Francesca Demichelis. *Helvetica Physica Acta,* v. 26, nos. 3-4, 1953, p. 329-348.

Contribution for unification of the measurement systems. 26 ref. (S22)

311-S. (German.) **Supersonic Testing by the Impulse-Echo Process and by Passing Sound Through a Sample.** Helmut Krainer and Ekkehart Krainer. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 229-236.

Test uses of supersonic apparatus. Determines relation of grain size to transmission of sound. Photographs, graphs, tables. 23 ref. (S13)

312-S. (German.) **Thermo-Electric Temperature-Measuring Arrangement for High-Precision Demands, Especially for Thermal Analysis.** Walter Hunsinger. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 261-264.

Measuring arrangement whereby very exact measurements of temperatures at terminal points and abrupt breaks in T-T curves are possible. Diagrams. (S16)

313-S. (Norwegian.) **Sound Transmission Tests on Welded Seams.** G. Fagerholt. *Teknisk Ukeblad,* v. 100, no. 19, May 7, 1953, p. 394-397.

Theory and methods of detecting flaws in welded seams with ultrasounds. Diagrams, graphs, photographs. (S13)

314-S. Measurement of the Bearing Length of Drawing Dies. *Industrial Diamond Review,* v. 13, July 1953, p. 158-162.

Development of instruments to measure bearing length. Diagrams. (S14)

315-S. Ultrasonic Testing Improved With Use of Liquid Coupling. J. B. Morgan. *Iron Age,* v. 172, Aug. 6, 1953, p. 131-135.

Use and advantages of liquid searching unit combining advantages of contact and immersion methods. Photographs, diagrams. (S13)

316-S. Russian Steels Today. Carl A. Zapffe. *Materials & Methods,* v. 38, Aug. 1953, p. 79-86.

Detailed picture of steels currently being used in Russia. Classification, compositions and applications of commonly used grades. Tables. (S22, T general, ST)

317-S. Photographic Inspection Spots Defective Brazing. M. A. Slairetam. *Materials & Methods,* v. 38, Aug. 1953, p. 94-95.

Advantages of inspection technique; procedure. Photographs. (S13, K8)

318-S. (French.) **How to Avoid Mixtures of Steel.** P. Devilder. *Métallurgie et la Construction Mécanique,* v. 85, no. 2, Feb. 1953, p. 95-99.

Methods of identifying various grades of steel products. Diagrams. (S10, ST)

319-S. (French.) **Experimental Comparison of Different Techniques for Detecting Fissures by Liquid Penetrants.** H. de Leiris. *Revue de Metallurgie,* v. 50, no. 3, Mar. 1953, p. 159-168; disc., p. 169.

Various solvents and coloring agents, typical applications. (S13)

320-S. (French.) **Identification and Analysis of Inclusions in Steel.** Jean Massinon. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 264-274; disc., p. 274.

I_2 solution method was compared with electrolytic analysis. Reliability and applications. Photographs, tables. (S13, ST)

321-S. (German.) **Length and Angle-Measuring Instruments.** M. Dühmke. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 615-618.

Mechanical, optical, electrical and electronic measuring instruments. Photographs. 12 ref. (S14)

322-S. (German.) **Measuring and Regulating Instruments for Flow Technology.** W. Weber. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 619-620.

Flow, pressure measuring and recording devices. Photographs. (S18)

323-S. (German.) **Regulation Techniques.** W. Hunsinger. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 627-632.

Variety of regulators and controls for industrial applications. Photographs. 110 ref. (S general)

324-S. Gage Control That Cuts Rejects to 2%. Ralph Hixenbaug. *Factory Management and Maintenance,* v. 3, Aug. 1953, p. 112-115.

Gage laboratory, inventory and inspection program. Diagrams, photographs. (S14)

325-S. Control of Metallurgical Standards. W. J. Harris, Jr. *Industrial Heating,* v. 20, Aug. 1953, p. 1500, 1502, 1504, 1506, 1508, 1510.

Condensed from paper delivered before American Standards Assoc. in New York, N. Y. Emphasizes necessity of integrating government research findings with the standards and specifications of the traditional consumer-producer team. (S22)

326-S. SAE Standard Double-Wall Steel Tubing. *Machinery, (American),* v. 59, Aug. 1953, p. 255.
Data sheet. (S22)

327-S. A Precise Angular Standard. *National Bureau of Standards Technical News Bulletin,* v. 37, Aug. 1953, p. 118-119.
Polygon to calibrate angle gage blocks. Photographs. (S22)

328-S. A Rational System of Limits. F. W. M. Lee. *Tool Engineer,* v. 31, Aug. 1953, p. 54-58.
System taking into account modern size tolerance requirements and allowing for flexibility. Tables. (S14)

329-S. Ultrasonic Testing of a Large Engine Crankshaft. W. A. Black. *American Iron and Steel Institute,* New York, May 1953, 17 p.
Effectiveness of the ultrasonic tester in ferreting out flaws in large productioni tems. Diagrams, photographs. (S13, ST)

330-S. Radiography and Cobalt-60. G. J. Barker. *American Foundryman,* v. 24, Aug. 1953, p. 44-46.
Reactions and use of Co-60 in testing foundry castings. Safety precautions. Photographs. (S13, S14, S15)

331-S. Segregates—Determination of Metal Compositions by Spectrographic Analysis. Kazuo Yasuda. *Castings Research Laboratory, Report,* no. 4, 1953, p. 63-65.
Segregation of Mn and Si in cast iron was determined. Graphs. (S11, CI)

332-S. Paint Coating Thickness Meters. II. R. Quarendon. *Engineer,* v. 196, Aug. 7, 1953, p. 162-166.
Includes instruments for coatings on magnetic, nonmagnetic conducting and nonconducting materials. Diagrams, photographs. (S14, L26)

333-S. Testing Frame for Ships' Structures. *Engineering,* v. 176, July 24, 1953, p. 115-116.
Testing frame and its use. Photograph. (S21)

334-S. Industrial Radiography. R. E. MacDonald. *Engineering Journal,* v. 36, Aug. 1953, p. 1003-1011.
Factors involved in industrial radiography. A more detailed description of the radiographic procedure is given, particularly the inspection of new all-welded destroyer escort vessels. Photographs. 17 ref. (S13, S14, S15)

335-S. Oxygen Measurement. Owen K. Seffern. *Instruments,* v. 26, Aug. 1953, p. 1211-1216.
Direct oxygen measurement using the paramagnetic technique. Brief explanations of other common methods. Diagrams, photographs. (S11)

336-S. Cut Engineering Costs With High Speed Motion Pictures. A. E. Ground. *Iron Age,* v. 172, Aug. 27, 1953, p. 97-100.
High-speed camera for use in metal-working operations. Photographs. (S general)

337-S. An Interferometer for Examining Polished Surfaces. Ronald E. Sugg. *Mechanical Engineering,* v. 75, Aug. 1953, p. 629-631.
Paper presented at the Spring Meeting of the ASME, Columbus, Ohio, Apr. 28-30, 1953. Multiple-beam interferometer which is portable and suitable for use wherever the examination of fine surface detail is required. Diagrams. (S15, Al, Cr, CI)

338-S. A New Standard for Spline Gaging. George L. McCain and Albert S. Beam. *Standardization,* v. 24, Aug. 1953, p. 228-236.
Details of spline and gaging standards, primarily for use with involute splines. Diagrams, tables. (S22)

339-S. Immersion Ultrasonic Inspection. The Development of a New Technique. Thomas A. Dickinson. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 296-297, 308.
Equipment based on the "echo" principle. Photographs. (S13, S14)

340-S. Magnaflux for Quality Control of Pipe-Line Welds. George L. C. Dehn. *Welding Journal,* v. 32, Aug. 1953, p. 721-727.
Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Need for quality control type of current, inspection procedure and typical defects. Diagrams, photographs. (S13, CN)

341-S. (German.) **Testing Apparatus for Anodic Coatings.** *Aluminium Ranshofen, Mitteilungen,* 1953, no. 1, Apr. p. 6-8.
Apparatus for nondestructive testing of anodic coatings on Al. Measurement of transmissivity is basic principle. Photograph, diagrams. (S13, S14, S15, Al)

342-S. (German.) **Surface Testing With the Interference Microscope.** W. Illig. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 97-104.
Principle of the interference method and how to evaluate resulting recordings. Diagrams, photographs. (S15)

343-S. Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys. Jerome Strauss, chairman, *American Society*

for Testing Materials, Preprint no. 6, 1953, 7 p.

Recommendations and revisions of standards and specifications covering stainless steel wire strands. Table. (S22, SS)

344-S. Report of Committee B-1 on Wires for Electrical Conductors. D. Halloran, chairman, *American Society for Testing Materials,* Preprint no. 7, 1953, 18 p.

Recommendations and revisions of standards and specifications. Tables. (S22, Ti, Cu)

345-S. Report of Committee B-2 on Non-Ferrous Metals and Alloys. Bruce W. Gonser, chairman, *American Society for Testing Materials,* Preprint no. 8, 1953, 2 p.

Recommendations for revision of specifications. (S22, EG-a)

346-S. Report of Committee B-4 on Electrical Heating, Resistance, and Related Alloys. S. A. Standing, chairman, *American Society for Testing Materials,* Preprint no. 10, 1953, 7 p.

Recommendations and revisions of specifications for high-resistivity, low-temperature-coefficient wire. (S22, Cu, SG-q)

347-S. Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. G. H. Harnden, chairman, *American Society for Testing Materials,* Preprint no. 11, 1953, 10 p.

Recommendations and revision of specifications affecting standards for Cu. Tables. (S22, Cu)

348-S. Report of Committee B-6 on Die-Cast Metals and Alloys. W. Babington, chairman. *American Society for Testing Materials,* Preprint no. 12, 1953, 8 p.

Revision of specifications. Tables. (S22, E13, Al, Cu, Zn)

349-S. Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. I. V. Williams, chairman. *American Society for Testing Materials,* Preprint no. 13, 1953, 11 p.

Revisions of specifications. Tables. (S22, Al, Mg)

350-S. Ultrasonic Inspection of Welded Pressure Vessels. *Engineer,* v. 196, Aug. 14, 1953, p. 199-202.

Ultrasonic techniques in the inspection of plates and welded pressure vessels. Diagrams, graphs. (S13, K9)

351-S. Ultrasonic Testing of Castings. Thomas A. Dickinson. *Foundry,* v. 81, Sept. 1953, p. 221-222, 224, 226.

"Immersion" testing technique which detects internal flaws in all but the most porous types of castings. Diagram. (S13)

352-S. Ultrasonic Methods of Inspection. M. H. Baddeley. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 261-264, 274.

Scientific principles involved in ultrasonics. Short history of the application of the phenomena to flaw detection and types and uses of instruments. Diagrams, photographs. 4 ref. (S13)

353-S. Ultrasonic Testing of Welded Pressure Vessels. *Industrial Chemist and Chemical Manufacturer,* v. 29, Sept. 1953, p. 394-396.

New method. Faults are found in metal plates over ⅜ in. thick. Both probes are placed on the same side of the plates. (S13)

354-S. Radioisotopes in Industry. Philip Miller. *Industry and Power,* v. 65, Sept. 1953, p. 72-75.

Fission products and their uses in drug sterilization, food processing, polymerization, phosphor activation and testing devices. Graph, photographs, tables. (S19)

355-S. Testing Electrical Instruments. F. D. Weaver. *Instruments,* v. 26, Sept. 1953, p. 1362-1363, 1408-1410, 1412.

Methods, equipment and simple circuits for standardizing electrical instruments. Diagrams. 9 ref. (S22)

356-S. Cesium Radio Isotope. New Tool for Parts Inspection. J. M. Thompson and P. A. Glenn. *Iron Age,* v. 172, Sept. 10, 1953, p. 174-176.

Properties, uses and precautions necessary for use of Cs^{137} as inspection tool. Graphs, diagrams, photographs. (S19)

357-S. A Maintenance Material Program. J. E. Anderson and J. B. Whitlock. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 75-81; disc., p. 81-82.

Causes and prevention of failures in equipment. Photographs, tables. (S21)

358-S. Detection of Microcracks in Steel. W. L. Jensen and R. F. Campbell. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1222.

Micrographs. (S13, CN)

359-S. How Size Tolerances Affect Gaging Requirements. Earle Buckingham. *Machinery,* v. 60, Sept. 1953, p. 176-185.

Size, form, position and functioning of a product. Diagrams. (S14)

360-S. Units for Measuring Variations in Measurements. W. J. Youden. *Metal Progress,* v. 64, Sept. 1953, p. 91-96.

Value of statistics in precision measurements. Photograph. (S12)

361-S. Profiloscope for Wire Drawing Die Inspection. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 101-102.

Theory and operation of new instrument for rapid quality control. Photographs. (S14)

362-S. Inspection Methods Keep Output of Flying Boxcars "on Target". Arthur H. Allen. *Metal Progress,* v. 64, Sept. 1953, p. 97-104.

Distinctive design of the plane with specialized functional characteristics, original and efficient manufacturing-assembly concept, and system of quality control. Photographs. (S general, T24)

363-S. Some Applications of High-Power Ultrasonics in the Metal Industries. E. A. Neppiras. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953. p. 391-398.

Use in mechanical testing, machining, surface cleaning, and soldering. Diagrams, photographs, micrograph. (S13, G17, L10, K7)

364-S. The Art of Radiography. Norman C. Miller. *Nondestructive Testing,* v. 11, Sept. 1953, p. 11-15.

Equipment and techniques for inspecting unusual and difficult structures. Photographs, diagrams. (S13, S14, S15)

365-S. Report on the Investigation of Betatron Radiographic Techniques. Clark J. Smith. *Nondestructive Testing,* v. 11, Sept. 1953, p. 17-22.

Results of five investigations on essential phenomena that must be considered in good practice. Photographs, charts. (S13)

366-S. Gamma Radiography With "Pentatron". *Nondestructive Testing,* v. 11, Sept. 1953, p. 23-25.

Equipment for safe handling of radioactive isotopes used in nondestructive testing. Photographs, diagrams. (S19)

367-S. Properties of Some Radioactive Isotopes Useful in Radiography. Jerome Kohl. *Nondestructive Testing,* v. 11, Sept. 1953, p. 33-37.

Important radiographic properties of several materials to aid in selection of radiation sources for nondestructive testing. 12 ref. (S19)

368-S. A New Non-Destructive Test for Welded Varnish Plant. H. Manley. *Paint Manufacture,* v. 23, Sept. 1953, p. 293-294.

Ultrasonic testing of welds. (S13)

369-S. Porosity of Electrodeposited Metals. XII. Measurement of Surface Roughness and Its Change in Exposure. N. Thon, Ling Yang and Stella Yang. *Plating,* v. 40, Oct. 1953, p. 1135-1137.

Method of obtaining true specific surface area of a solid. Diagrams. 2 ref. (S15, L17)

370-S. Seven Methods for Solving Structural Test Problems. Warren W. Bradley. *Product Engineering,* v. 24, Sept. 1953, p. 172-176.

Hydraulic jack loading, proportioning valve, dead weight tests, wear testing, drop testing, bending test on closed sections and vacuum test of pressure vessels. Diagrams, photographs. (S21)

371-S. Proving Ground Moves Indoors. L. W. Fischer, R. W. Roush, and E. B. Stavely, Jr. *SAE Journal,* v. 61, Sept. 1953, p. 57-60.

Excerpts from paper presented at SAE Annual Meeting, Detroit, Jan. 12, 1953. Equipment and methods for testing axles. Diagrams, graphs, photographs. (S21)

372-S. The Problems of Furnace Control. I. Leo Walter. *Steel Processing,* v. 39, Sept. 1953, p. 450-454, 469.

Fundamentals of automatic high temperature and combustion control. Diagrams. (To be continued.) (S16)

373-S. Optical Methods Simplify Tooling Problems. Andrew E. Rylander. *Tool Engineer,* v. 31, Sept. 1953, p. 42-46.

Various apparatus and methods to simplify work in airframe fabrication. Photographs, diagrams. (S13, S14, S15)

374-S. Continuous Gaging for Machine Control. Albert C. Sanford. *Wire and Wire Products,* v. 28, Sept. 1953, p. 877-878, 925-926.

Various methods of gaging bare and plastic coated wire conductors to determine off-size and lack of uniformity in outside diameters. Photographs. (S14)

375-S. (English.) Specifications of the Products Made by the CIA. De Acero Del Pacifico, Talcahuano, Chile. Oscar Herrera. Bogota Conference, 1952. ST/ECLA/CONF. no. 1/L.80, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Tables showing chemical composition, physical properties and usual dimensions of products. Tables. (S22, C1)

376-S. (French.) Testing Methods for Evaluating the Brilliance of Aluminum Sheets. J. Herenguel and J. Boghen. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 317-327.

Method yielding a concrete classification figure. Results obtained with visual examination and reflection measurement by means of photoelectric cell. Diagrams, micrographs, tables. (S15, A1)

377-S. (German.) **Fracture Coefficient and Thickness of Thin Anodically Produced Aluminum Oxide Layers.** R. Bahn and O. Böttger. *Zeitschrift für Physik,* v. 135, no. 4, July 1953, p. 376-379.

Determination by two interferometric methods. Density did not increase linearly with oxidation stress. Fracture coefficent was constant. Graphs, diagram. 6 ref. (S14, L19, Q26, Al)

378-S. (Italian.) **The Density and the Gravimetrically Determined Thickness of Anodic Coatings.** A. Prati. *Alluminio,* v. 22, no. 2, 1953, p. 148-151.

Weights determined directly by means of a hydrostatic balance, and indirectly from the weight value determined according to the method of ASTM B137-45. Thickness was measured by an Abbe unit. Tables. 4 ref. (S14, L19)

379-S. (Spanish.) **Notes on Steel Specifications for Different Uses.** Federico Frick. Bogota Conference, 1952. ST/ECLA/CONF. no. 1/L.78, 1952, 75 p. Published jointly by ECLA-TAA for United Nations.

Classification of steels based on chemical composition and mechanical properties. (S21, ST)

380-S. (Spanish.) **Evaluation of Arc-Welded Structure by Non-Destructive Methods.** Mariano de Izuzquiza. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 12 p.

Magnetic, ultrasonic, and radiographic nondestructive testing methods. Diagrams. 6 ref. (S13, Fe, Al, Cu)

381-S. (Swedish.) **Temperature Measurement in Melts of Copper Alloys.** Morris Itzel. *Gjuteriet,* v. 43, no. 7, July 1953, p. 127-132.

Advantages and disadvantages of various types of thermometers for thermo-electric measurements. Thermocouples, millivoltmeters and potentiometers. Diagrams. 3 ref. (S16, Cu)

382-S. (Book.) **ASTM Standards on Copper and Copper Alloys.** 542 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $5.00 paper-bound; $5.65 cloth-bound.

Presents 115 specifications, test methods, and recommended practices pertaining to Cu and Cu alloy castings, sheet, strip, bars, shapes, wire, pipe and tube, filler metal, and covered steel electrical conductors. Specifications are given for other nonferrous metals including Zn, Pb, Ni, phosphor-Cu, and Si-Cu. (S22, Cu, Zn, Pb, Ni)

383-S. (Book.) **Non-Destructive Testing.** Horace Manley. 1953. The Association of Engineering and Shipbuilding Draughtsmen, London. 3s.

Mainly concerned with testing of metals but covers ceramics and other structural materials. Peculiarities of various techniques are discussed. (S general, Q general)

384-S. Some Tools for Quality Control. Thomas W. Curry. *Foundry,* v. 81, Oct. 1953, p. 110-113, 214, 216-217, 220, 222.

How a leading gray iron foundry goes about controlling variables involved in foundry practice. Photographs. (S12, E general, CI)

385-S. Non-Destructive Gamma Radiography for Diamond Tools. *Industrial Diamond Review,* v. 13, Sept. 1953, p. 210-212.

Technique for testing the setting of diamond tools. Photographs, table. 10 ref. (S14)

386-S. "Immersion" Increases Efficiency of Ultrasonic Weld Inspection. John Starr. *Industry & Welding,* v. 26, Oct. 1953, p. 64-66, 68, 71.

How most objectionable features are eliminated from older units. Photographs, diagrams. (S13)

387-S. Automatic Process Control. *Iron Age,* v. 172, Oct. 8, 1953, p. 273-320.

Latest developments in the field, including gaging, sorting, heat treating, plating solution control, melting, rolling, welding, counting, weighing and foundry practice. (S18)

388-S. Conductivity. Now a Useful Nondestructive Testing Tool. Henry N. Staats. *Materials & Methods,* v. 38, Oct. 1953, p. 124-126.

Instrument, developed in Germany, which directly measures electrical conductivity of materials. It can be used for sorting nonferrous metals and alloys, identifying unknown metals, evaluating hardness and checking heat treating results. Photographs, charts. (S10, P15, Al, Mg)

389-S. Measurement and Control of the Thickness of Thin Films. K. M. Greenland. *Vacuum,* v. 2, July 1952, p. 216-230.

Gravimetric, photometric, polarimetric, interferometric, X-ray and electrical methods. Diagrams. 56 ref. (S14)

390-S. (German.) **Principles and Methods of Nondestructive Testing With Ultrasound Waves.** A. Lutsch. *Archiv für technisches Messen,* 1953, no. 212, Sept. p. 209-210.

16 references. (S13, S14, S15)

391-S. (German.) **Ultrasonic Testing of Weld Seams.** Hans Krächter, J. Krautkrämer, and H. Krautkrämer. *Schweissen und Schneiden,* v. 5, no. 8, Aug. 1953, p. 305-314.

Ultrasonic and X-ray techniques. Photographs, diagrams, tables, graph. (S13)

392-S. (Italian.) **Radiographic Examination of Welds. A Complete Assessment of Defects in Terms of Tensile and Fatigue Strength.** Oscar Masi and Antonio Erra. *Metallurgia italiana,* v. 45, no. 3, Aug. 1953, p. 273-283.

Tables, diagrams, graphs, photographs. 7 ref. (S13, Q27, Q7)

393-S. The Industrial Applications of Radioactive Materials. John Cockcroft. *Atomics (British),* v. 4, Oct. 1953, p. 245-252.

General field of uses. Photographs, diagrams, tables. (S19)

394-S. Radiation Pyrometry. T. J. Schlottenmier. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 102-111.

Principles of radiation pyrometry, with emphasis of energy transfer considerations and factors affecting target size and definition. Diagrams, photographs. 3 ref. (S16)

395-S. How Form Tolerances Affect Gaging Requirements. Earle Buckingham. *Machinery,* v. 60, Oct. 1953, p. 197-203.

How profile tolerances are selected and how they determine gaging requirements. Diagrams. (S14)

396-S. Optical Gaging of Cams Saves Time. *Western Machinery and Steel World,* v. 44, Oct. 1953, p. 94-95.

How principles can be applied to similar problems arising on production lines and in machine shops. Diagram, photographs. (S14)

397-S. (French.) **Use of Radio-Elements in Metallurgy.** A. Kohn. *Institut de Recherches de la Sidérurgie, Publication,* ser. B, no. 20, June 1953, 22 p. Reprinted from *Documentation Métallurgique,* Jan., Feb., Mar., 1953, no. 13, p. 9-30.

Methods. Tables, micrographs. 79 ref. (S19, Cr, Sb, Fe, Co, K)

398-S. (German.) **A. Testing With Energy Radiation. Testing with X-Rays, Gamma-Rays, and Beta-Rays.** R. Berthold. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 123-126.

Methods of testing for casting defects, corrosion, bearing wear, volume of sealed containers, furnace linings, wall thickness and densities. Graphs. (S13, S14, R11, Q9, P10)

399-S. (German.) **Synthetic Radioactive Isotopes in Nondestructive Materials Testing.** E. A. W. Müller. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 126-130.

Preparation, economy and effect of intensity and conditions on test results. Diagrams, photographs. (S19)

400-S. (German.) **Measurement of Surface Temperature With Rolled-Out Thermocouple Elements.** W. Nunner. *Chemie-Ingenieur-Technik,* v. 25, no. 7, July 1953, p. 386-390.

Simple arrangement. Annealing of wires after rolling permits continued use of original calibration curve without error. Graphs, photograph. 7 ref.
(S16, Ni, Pd, Ag, Cu, Pt, Au, Fe)

401-S. Measuring Surface Roughness. *Canadian Metals,* v. 16, Oct. 1953, p. 66-67.

Electronic roughness tester, particularly suitable for workshop, which can be used for the above against chosen standards. Table, diagram. (S15)

402-S. Movable-Anode Tube Gages Surface Roughness. Joseph B. Bidwell. *Electronics,* v. 26, Nov. 1953, p. 181-183.

Unit adaptable to wide range of surfaces. High electrical output of tube reduces complexity of amplifying and indicating circuits. Diagrams, graphs, photographs. (S15)

403-S. Wire Testing by Ultrasonic Methods. R. Pohlman. *Engineers' Digest,* v. 14, Oct. 1953, p. 393-394.

Translated from *Draht,* v. 4, no. 6, June 1953, p. 211-214. Testing of small or thin sections by the "transmitted pulse" method. Diagrams. (S13)

404-S. Metal-Ceramic Wall. Lengthens Thermocouple Life. P. B. McSherry. *Iron Age,* v. 172, Oct. 29, 1953, p. 100-101.

Composition of new protective tubes and characteristics imparted by each ingredient. Photographs, diagrams. (S16, T5)

405-S. Analysis and Correlation of Test Data. Irving W. Burr. *Metal Progress,* v. 64, Oct. 1953, p. 112-118, 282-284.

Technique and advantages of applying statistical methods to the analysis of test data. Graph, table, photographs. (S12)

406-S. (German.) **Magnetic and Electrical Methods of Nondestructive Testing.** Werner Jellinghaus. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 168-174.

Methods of investigating properties, locating defects and making

thickness measurements. Diagrams, graphs. 29 ref. (S13, S14)

407-S. (German.) **Electronic Instruments for Nondestructive Materials Testing.** H. Breitfeld. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 175-178.

The "Forster", "Magnatest Q", "Multitest" and "Sigmatest" instruments. (S13, Al, Cu)

408-S. (German.) **Magnetic Powder Testing.** E. A. W. Muller. *Berg- und Hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 98, nos. 7-8, July-Aug. 1953, p. 178-180.

Different procedures for detecting defects. Photographs, diagrams. (S13)

409-S. (German.) **Nondestructive Testing of Large Castings.** *Giesserei,* v. 40, no. 20, Oct. 1953, p. 543-547.

Oil-line, magnetic-powder, and stress-gage processes, and water-pressure, X-ray, and ultrasound test methods. Photographs, graphs. (S13, CI, Ni, Cr)

410-S. (Book.) **Statistical Quality Control and Acceptance Sampling. (Ordnance Inspection Handbook ORD-M 608-9).** U. S. Army Ordnance Corps. 1952. 103 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $2.00.

Reviews fundamentals governing sampling procedures and quality control. Tables, charts. (S12)

SECTION T

APPLICATIONS of METALS in EQUIPMENT and INDUSTRY

1-T. Sub-Zero Hand-Tool Failures Suggest New Steels and Treatments. Sam Tour. *American Machinist,* v. 96, Nov. 24, 1952, p. 154-155.

Tabulated information on tests to determine what steels and heat treatments are required for hand tools subjected to extreme cold. Includes impact-strength tests. (T6, Q6, J general, CN, AY)

2-T. Magnesium in Structural Design. D. A. Beck. *Modern Metals,* v. 8, Nov. 1952, p. 66-68, 70.

Rigidity, stresses, and tolerances. Use for skin and advantages of wrought and casting alloys. Extended use of extrusions is expected. (T26, Q23, Mg)

3-T. 67 Forgings Welded Together Form a Diesel Crankcase. *SAE Journal,* v. 60, Nov. 1952, p. 24-25. (Based on paper "Development of a 16 Cylinder, Vertical, Radial Diesel Engine" by Eric R. Brater.)

Production of Cleveland Diesel Model 338 vertical radial engine. (T25, Q25, K general, ST)

4-T. What's Ahead the Next Ten Years in Materials and Components. *American Machinist,* v. 96, Mid-Nov. 1952, p. A2-A21.

Materials and components include construction steels, special coatings, Al, Cu alloys, Mg, Ti, Ni, Zr, Pb, Zn, Sn, Cd, Mo, Si, Be, Th, Hf, In, Li, Na, B, Ga, Ge, Hg, Re, plastics, electrical equipment, power-transmission equipment, hydraulic and pneumatic equipment and lubrication. (T general, A general)

5-T. Putting the Uncommon Metals to Work. Robert I. Jaffe. *Battelle Technical Review,* v. 1, Nov.-Dec. 1952, p. 126-127.

Use of less common metals of Zr, Be, and Mo in nuclear engines; Ti, Mo, and Cr in heat engines; and Ge, Si, Se, W, Ta, and Re in electrical applications. Unique properties. (T25, T1)

6-T. Heat Recovery in Industrial Furnaces. A. Clift and C. Knight. *Journal of the Iron and Steel Institute,* v. 172, Nov. 1952, p. 327-339.

Important features of both direct and other forms of heat recovery in industrial furnaces and possible future developments. Tables, charts, and diagrams. (T5)

7-T. The Use of Castings in Airframe Design. *Metal Progress,* v. 62, Nov. 1952, p. 67-72.

Actual and potential examples. Tensile properties of various Al and Mg casting alloys compared with those of heat treated steels and wrought Al alloys. Recommended designs and molding methods. (T24, Q27, E19, Al, Mg)

8-T. Metals in Radioactive Static Eliminators. J. D. Graves. *Metal Progress,* v. 62, Nov. 1952, p. 94-96.

Nature of the devices, use of various radioactive metals in them, health hazards, and industrial applications. (T8, P13)

9-T. Evaluating and Redesigning Magnesium Truck Wheels. *Modern Metals,* v. 8, Nov. 1952, p. 38-40, 42, 44.

How most efficient design may be accomplished. Results of tensile and stress-coat tests are tabulated. (T21, Q27, S13, Mg)

10-T. More Indium Metal. . .Can You Use It? *Steel,* v. 131, Dec. 8, 1952, p. 98-99.

Present and possible future uses of In, including its alloys with Pb, Sn, Cd, and Bi. Physical and mechanical properties. (T general, P general, Q general, In)

11-T. Designers Put More "Sell" Into Ranges With Stainless. W. B. Nixon. *Stove Builder,* v. 17, Dec. 1952, p. 38-41, 88.

Favorable characteristics of Type 430 stainless steel for use on stoves.

Recommendations for forming sheets, and for finishing.
(T10, G1, L general, SS)

12-T. Aluminum in the Canning Industry. Obering D. Nickelsen and S. Buschmann. *Aluminium,* v. 28, Nov. 1952, p. 383-391.

As developed in Norway. Fabrication methods, costs, and applications are compared with those of tin plate. Continuous anodizing and composition of Al strip. Photographs and diagrams. (T29, L19, Al)

13-T. All Steel Rotary Hose Made for Work on Portable Rigs. *Drilling,* v. 14, Dec. 1, 1952, p. 123.

New all-steel rotary hose unit developed by Chicksan Co., and its advantages over conventional equipment. (T28, ST)

14-T. Material Specifications for Oil-Film Bearings. E. B. Etchells. **Tired Bearings—Reasons and Remedies.** J. Palsulich. **Role of the Lubricant in Bearing Fatigue.** E. S. Carmichael and R. B. Purdy. *Lubrication Engineering,* v. 8, Dec. 1952, p. 291-297, 312-314, 316.

Selection of metal compositions for various applications in oil-film bearings; factors and functional differences that influence choice of available bearing materials. Composition and construction of sleeve bearings in common use. Comparative resistance to fatigue of various bearing materials in tabular form. How lubricant can minimize fatigue. Tables, graphs, and diagrams. 24 ref. (T7, Q7, SG-c)

15-T. All-Magnesium Car Body. *Metal Industry,* v. 81, Nov. 21, 1952, p. 409-411.

The body is built in sections which are welded together. Details of various sections. (T21, Mg)

16-T. Stainless Steel in the Petroleum Industry. Rolt Hammond. *Petroleum,* v. 15, Dec. 1952, p. 321-325.

Range of stainless steels available to the petroleum technologist. Stresses need for careful appraisement of operating conditions before any particular alloy is selected for any specific purpose. (T29, SS)

17-T. Stainless Steel and Aluminium in the U.S.A. *Petroleum,* v. 15, Dec. 1952, p. 328-330.

Visit to U.S.A. was made by Great Britain Technical Assistance Mission in order to investigate reasons for leading position of U.S. in the chemical and petroleum industries. This part of report deals with uses of stainless steel and aluminum. Tables. (T29, SS, Al)

18-T. Aluminum Parts Cut Weight in Family of Marine Diesel Engines. *Product Engineering,* v. 23, Dec. 1952, p. 144-145.

How Al castings and forgings replace conventional cast iron and steel parts in a family of new lightweight marine diesel engines developed by Packard Motor Co., for U. S. Navy. (T25, Al, CI, ST)

19-T. Corrosion Resistant Alloys. James T. Gow. *Pulp & Paper,* v. 26, Dec. 1952, p. 96, 98, 100, 102.

Fe-Cr alloys, Fe-Cr-Ni alloys, and Ni-base alloys which are used in pulp and paper mills and other corrosive services.
(T29, R general, Fe, Cr, Ni)

20-T. Bridge Features Use of Steel Forms for Concrete Piers. *Railway Engineering and Maintenance,* v. 48, Dec. 1952, p. 1184-1185.

A feature of the new railway bridge now being constructed over the Missouri river near Chamberlain, S. D. (T26, ST)

21-T. (Book.) **101 New Uses for Porcelain Enamel.** Porcelain Enamel Institute, 1010 Vermont Ave., N.W., Washington 5, D. C. $6.00.

A comprehensive listing of feasible applications of porcelain enamel. Possible products range from hog feeders to ship bulkheads.
(T general, L27)

22-T. (Book.) **Automotive Bearing Manual.** 96 pages. Johnson Bronze Co., New Castle, Pa. $1.00.

Basic bearing considerations, and required bearing properties. Describes and illustrates all types of bearings such as direct babbitted bearings; nonprecision bearing liners; precision insert bearings; floating type bearings; camshaft bearings; sleeve-type bushings; and thrust washers. The largest section of book is devoted to automotive bearing care. (T7, SG-c)

23-T. World's Largest Wing Tanks. William P. Brotherton. *Aero Digest,* v. 65, Dec. 1952, p. 90, 92, 94, 96-99.

Fabrication of Al tanks by means of spot welding techniques.
(T24, K3, Al)

24-T. Springs. W. E. Frost. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 69, Pt. 2, Dec. 1952, p. 91-110.

Methods of manufacture of laminated and helical steel springs. The latter are made both hot (hardened and tempered) and from hard drawn wire. The complex stresses existing in both types. Various analyses and treatments, and methods of improving life at higher stresses by grinding, shot peening and vapor blasting. Diagrams and graphs. (T7, Q25. AY)

25-T. How to Save Those Critical Alloys. *Petroleum Processing,* v. 7, Dec. 1952, p. 1776-1777.

Means to conserve Ni and Mo in ferritic alloy steels used in refineries for both high and low-temperature service. Applies largely to alloys used primarily in pipe, tubing, cast and forged valves, fittings, and accessory equipment.
(T29, AY, Ni, Mo)

26-T. Magnesium Gains Favor as Plane Metal. Irving Stone. *Aviation Week,* v. 57, Dec. 29, 1952, p. 31-34.

Fabrication of cast parts for various types of planes. Finish problems, corrosion data, and individual parts.
(T24, L general, R general, Mg)

27-T. Frigidaire Mobilizes Modern Techniques. *Canadian Metals,* v. 15, Dec. 1952, p. 40, 42, 44.

Fabrication of sheet steel to finished ranges, refrigerators, and many other products.
(T10, G general, ST)

28-T. Aluminium As a Cable Sheathing Material. D. McAllister. *Engineer,* v. 194, Dec. 19, 1952, p. 819-823; Dec. 26, 1952, p. 854-857.

New techniques which were developed for sheathing and handling cables, together with an account of general properties of Al sheaths. Advantages and disadvantages of Al, production of Al, and extrusion. General properties of Al sheaths, ease of installation, process of jointing, and resistance to corrosion. Diagrams and photographs. 15 ref. (T1, Al)

29-T. Stainless Steel Parts Reduce Maintenance Costs. Milton Gallup. *Iron Age,* v. 170, Dec. 25, 1952, p. 68.

Maintenance and downtime can be reduced by replacing carbon steel nuts, bolts and other parts with stainless steel parts. (T7, SS)

30-T. More Aluminum Use. *Light Metal Age,* v. 10, Dec. 1952, p. 22-24.

Future uses of Al. Predicts oil and gas industry to become high consumer. (T27, Al)

31-T. Aluminium in Polar Exploration. Wilfred Deacon. *Light Metals,* v. 15, Dec. 1952, p. 386-389.

Use of Al during the early explorations of the Polar region and the British expedition now in North Greenland. (T general, Al)

32-T. The Use of Stainless Steel for Filters. *Machinery* (Lloyd), v. 24, Dec. 1952, p. 89-93.

Recent development in field of filtration. Method of manufacture, cleaning, grading, and joining unit compacts. (T29, SS)

33-T. Alloy Steels for Plastic Moulds and Hobs. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 24, Dec. 20, 1952, p. 79-83.

Mold requirements, high carbon, high Cr steel, and stainless steel for cut molds, hobbing, steels for master hobs, properties required, and forging.
(T6, F22, CN, AY, SS, TS)

34-T. The Manufacture of Aluminum Sheathed Cables. *Machinery Lloyd* (Overseas Ed.), v. 24, Dec. 20, 1952, p. 91, 93-95.

Phases in development of the J. & P. Sheathing Process, and details of the process. (1, Al)

35-T. Beryllium Copper As a Mould and Die Material. *Machinery* (London), v. 81, Dec. 19, 1952, p. 1277-1279.

Properties, mold and die applications, as inserts for die castings, hob design and materials, heat treatment of cast inserts, and machining and fabricating BeCu.
(T5, E13, G17, Cu)

36-T. Application of Aluminum Channel Conductors for Station Bus. E. J. Casey and N. Swerdlow. *Power Apparatus and Systems,* Dec. 1952, p. 1004-1009.

Compares qualities of Cu and Al for station busses. Shape of conductor, connections, and problems encountered in silver-plating of Al. Photographs, diagrams, and tables. 10 ref. (T1, L17, Al, Cu)

37-T. Color Comes of Age. *Steel Horizons,* v. 14, Year-end 1952, p. 3-6.

Application of stainless steel in equipment for producing and developing color film. Photographs.
(T9, SS)

38-T. On the Coal Chemical Frontier. *Steel Horizons,* v. 14, Year-End 1952, p. 12-13.

Use of stainless steel in equipment for manufacture of coal by-products. (T29, SS)

39-T. Building a Better Mousetrap? *Steel Horizons,* v. 14, Year-End 1952 p. 18-19.

Uses of stainless steel wire.
(T8, SS)

40-T. How to Prevent Failures in Sucker-Rod Joints. A. A. Hardy. *Oil and Gas Journal,* v. 51, Nov. 17, 1952, p. 371-374, 376-377.

Design features and handling techniques. Laboratory tests.
(T28, S21, ST)

41-T. Sectioned Steel Columns. *Overseas Engineer,* v. 26, Jan. 1953, p. 215.

Poles made in short tapered sections of welded sheet steel can be nested for transport or storage and assembled on site by the simple method of end insertion, without bolts, collars or other securing devices. (T26, K13, ST)

42-T. The Prefab Comes of Age. Henry F. Unger. *Steelways,* v. 9, Feb. 1953, p. 24-27.

Increasing development and demand for prefabricated steel buildings. (T26, ST)

43-T. Requirements for Large, Light-Metal Forgings and Extrusions in the Aircraft Industry. George W. Papen. *Aeronautical Engineering Review,* v. 12, Jan. 1953, p. 24-33.

General discussion supported by an analysis of trends in performance on aircraft structure, function, and production. Detail requirements of large forgings and extrusions relative to physical properties, tolerances, and refinements. Tables and diagrams. (T24, Al, Mg)

44-T. High Temperature Service. R. M. Braca and R. Merims. *Chemical Engineering,* v. 60, Feb. 1953, p. 165-169, 328, 330-332, 334-336.

Comprehensive survey to aid in selecting materials and designing equipment for high-temperature service in petroleum and chemical plants. Includes influence of alloying elements and mechanical properties of metals used. (T29, Q general)

45-T. Tests Establish Aluminum Connection Principles. C. P. Xenis. *Electric Light and Power,* v. 31, Jan. 1953, p. 128-130, 132.

Effects of indentation depth and resistance of bus joint connections. (T1, P15, Al)

46-T. LTF's New Copper Aluminum Bi-Metal Plate. James K. Martin. *Graphic Arts Monthly,* v. 25, Jan. 1953, p. 110, 112, 116, 118, 120, 123-124, 178, 180.

General discussion emphasizing recent applications. (T9, Cu, Al)

47-T. Selection of Engineering Materials; Ferrous Alloys. S. C. Churchill. *Machinery* (London), v. 82, Jan. 16, 1952, p. 109-114.

Reviews new processes successfully tested, and conventional designs produced in materials not normally associated with them. (T general, ST, CI)

48-T. Annual Engineering Materials Review and Forecast. T. C. Du Mond. *Materials & Methods,* v. 37, Jan. 1953, p. 101-116.

A quick look at developments in engineering materials reveals some changes in use of materials that will be forthcoming and influences that will bring these changes about. Discusses irons and steels; nonferrous metals including high-temperature alloys, carbides, Cu alloys, Al alloys, Mg, Ti, and minor metals; nonmetallic materials; parts and forms; finishes and coatings; and processing methods including heat treating and joining. Photographs. (T general, J general. K general)

49-T. Steel Wires for Pre-Stressed Concrete. Hermann Wedl. *Draht* (Wire) (English Ed.), Dec. 1952, p. 33-36.

Properties of steels, especially steel wires, which are used as prestressing members in ferro-concrete constructions. Comparison of steel qualities required for slack reinforcements and prestressed constructions. Manufacture of prestressed concrete wires and their most important properties. Standard specifications. Graphs. 11 ref. (T26, ST)

50-T. (English.) The Aluminium Collapsible Tube, Its Development and Use. G. H. Ott. *Aluminium Suisse,* v. 2, Nov. 1952, p. 185-197.

Development and typical applications. Photographs show details of the manufacturing processes. (T10, G general, Al)

51-T. Evaluation of Core Materials for Magnetic Amplifiers. I. D. C. Dieterly. *Electrical Manufacturing,* v. 51, Jan. 1953, p. 68-73, 274, 276; Feb. 1953, p. 124-127, 380.

Analysis is based on oscillographs of flux-current loop. Test circuit for establishing control magnetization curve for any core material. (T8, SG-n, p)

52-T. Aluminium Hangar for "Comet" Aircraft. *Engineering,* v. 175, Jan. 23, 1953, p. 97-99.

Extensive use of Al and fabrication of British hangar. (T26, Al)

53-T. Aluminum Conductors in Busway Systems. Joe St. Andre. *Factory Management and Maintenance,* v. 3, Feb. 1953, p. 110-112.

Use of Al in place of Cu. Includes six requirements for Al busway, seven factors for trouble-free operation, and corrosion tests of joint connections used by Underwriters' Laboratories. (T1, Al)

54-T. (French.) **Gas-Heated Infrared Radiation Driers.** Marc Fischer. *Fourth International Congress on Industrial Heating* (Paris), 1952, No. 90, 12 pages.

Two recent developments in field of infrared radiation drying: application of radiant panels made of ribbed cast iron, and driers with radiant tubes having ventilated burners. Schematic drawings. (T5, CI)

55-T. You'll Be Getting Better Electrical Sheet and Strip. N. P. Goss. *Iron Age,* v. 171, Feb. 5, 1953, p. 147-152, 186-188.

Use, production, and advantages of highly oriented polycrystalline Si steel in electrical industry. Photographs. (T1, AY)

56-T. Titanium Is Vital to the Air Force. John N. Dick. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 133-135.

Cooperation between industry and government for developing and utilizing Ti. (T24, Ti)

57-T. Navy Has Large Titanium Program. Edward L. Beardman. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 138-139.

Naval interest and part played in developing Ti. Present and possible future applications and research program. (T22, T24, Ag, Ti)

58-T. Application of Titanium Sheet-Strip Limited by Presently Available Alloys. J. W. Sweet. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 143-145.

Present status of Ti sheet and strip. Experiences of fabricators attempting to use it. Aircraft applications. Photographs. (T24, F22, G general, Ti)

59-T. Wrought Magnesium for Automobiles. *Light Metals,* v. 16, Jan. 1953, p. 11-12.

General discussion. (T21, Mg)

60-T. Progress in the Aluminum Industry. Junius D. Edwards. *Metal Progress,* v. 63, Jan. 1953, p. 94-98.

Recent uses for Al and its alloys in aircraft, marine and architectural industries. (T22, T24, T26, Al)

61-T. Notable Advances in Fabrication Methods and Metal Applications. Tom Bishop. *Metal Progress,* v. 63, Jan. 1953, p. 115-120.

Recent uses of alloy steels in jet turbine design, including disk and blade manufacture. Surface diffusion processes. Fabrication of tool and die steels. (T5, T25, L15, F22, AY, TS)

62-T. Ductile Iron, a New Design Material Steps Into Your Plant. *Power,* v. 97, Feb. 1953, p. 122-123.

Properties and uses in diesel engines, pump parts, and in power plants. Photographs. (T25, CI)

63-T. Aluminium Alloy Coaches. T. W. Barrow. *Railway Gazette,* v. 98, Jan. 16, 1953, p. 68-70.

Emphasizes design of new lightweight sleeping cars for East African Railways. (T23, Al)

64-T. Machine Tool Materials. W. D. Biggs. *Welder,* v. 21, Oct.-Dec. 1952, p. 91-94.

Materials used for machine tools. A short classification and properties which should be obtained. (T5, G17, TS)

65-T. Steel Won't Be Magnetic on This Non-Magnetic Ship. L. G. Stevens. *Welding Engineer,* v. 38, Feb. 1953, p. 23-25.

Use of Cr-Ni stainless steel for construction of a minesweeper. 200-amp. arc welders and oxyacetylene outfits are used. (T22, K1, K2, SS)

66-T. Structural Steel Assembly Line. Howard E. Jackson. *Welding Engineer,* v. 38, Feb. 1953, p. 43-46.

Fabrication of steel cradles and pots for use in Al reduction plant. Photographs. (T5, C23, CN, Al)

67-T. Cast Alloys for Salt-Bath Heat Treating. J. H. Jackson. *Alloy Casting Bulletin,* Nov. 1952, p. 1-5, 7-10.

Results of research project conducted at Battelle Memorial Institute for purpose of learning to what extent various high alloys corrode in salt baths. Experimental samples represented alloys of the Fe-Ni-Cr systems, with a specimen of mild steel included for comparison. (T5, R6, J2, AY, CN)

68-T. Selection of Materials for Use in Chemical Engineering. J. P. Baxter. *Australasian Engineer,* Dec. 8, 1952, p. 62-65.

The wide range of materials now available to design engineer, and some of the problems which may arise in their use. Includes steel, stainless steel, Ni, Al, Cu, Ag, Mo, W, Ti, and Zr. (T29)

69-T. New Stainless Steel Widens Design Possibilities. Gilbert C. Close. *Finish,* v. 10, Feb. 1953, p. 19-20, 82.

Advantages of 17-7PH precipitation hardening stainless steel alloy. (T general, SS)

70-T. Plastics: Machinery Market Booms. H. R. Simonds. *Iron Age,* v. 171, Feb. 12, 1953, p. 143-146.

Various types of equipment used in making prime materials for plastics industry. Much of this equipment is made of stainless, nickel-clad, and special steels. (T29, Ni, CN, CI, SS)

71-T. Aluminum Honeycomb Sandwich Structures. *Product Engineering,* v. 24, Feb. 1953, p. 184-191.

Construction; process control; effect of density on crushing and shear strength; and typical design and joint details. Photographs, diagrams, and tables. (T26, K12, Al)

72-T. New Bolting Material Good for the Tough Spots. J. F. Klement. *Steel,* v. 132, Feb. 16, 1953, p. 92.

Al bronze of iron-bearing single-phase type resists corrosion in salt water, alkalis, and acids. Graphs. (T7, R5, Al, Cu)

73-T. (Book.) **Steel Construction.** 70 pages. 1952. Anglo-American Council on Productivity, 21 Tothill St., London, S. W. 1, England; or 2 Park Ave., New York 16, N. Y.

Compares American and British methods. Technical detail covers structural steelwork in bridges and framed buildings, tanks, pressure vessels and pipes, and mechanical handling plant. (T26, ST)

74-T. New Fabricating Materials From Rubber and Copper-Clad Aluminum. *Canadian Chemical Processing,* v. 37, Feb. 1953, p. 54.

Cladding process, applications, use of bonding agents, and method of fabricating. (T29, L26, L22, Al, Cu)

75-T. Some Metallurgical Problems Imposed by Stratospheric Flight. P. L. Teed. *Journal of the Birmingham Metallurgical Society,* v. 32, Dec. 1952, p. 130-162.

Outlines foreseeable problems. Includes photographs, tables, and graphs. (T24)

76-T. Automotive Service Experience With Magnesium. F. H. Mason. *Modern Metals,* v. 9, Feb. 1953, p. 34, 36.

Corrosion experience; stress and fatigue; and machining factors. Photographs. (T21, Mg)

77-T. Ductile Cast Iron. Where Can It Be Used in Process Equipment? *Petroleum Processing,* v. 8, Feb. 1953, p. 234-235.

Possible uses in petroleum processing industry. (T29, CI)

78-T. (German.) **Advances in Materials for the Chemical Industry.** Luigi Piatti. *Chimia,* v. 7, Jan. 15, 1953, p. 3-11.

Advances made in cast iron, steels, heat resistant materials, stainless steels, plated steels, nickel, nickel alloys, nonferrous metals, newer metals, organic materials, graphite, carbons, enamels, glass, and ceramic wares. 160 refs.
(T29, CI, ST, Ni, EG-a)

79-T. (Italian.) **Collapsible Aluminum Tubes.** F. Emanuele. *Alluminio,* v. 21, Dec. 1952, p. 608-614.

Fabrication, characteristics, protection, and control of flexible Al tubes, with particular regard to its use for canning concentrated tomato puree. (T29, Al)

80-T. Nailing Down Their Market. *Business Week,* Feb. 21, 1953, p. 44, 46, 48.

Recent advances in Al nail industry. (T10, Al)

81-T. Aluminum in Electrical Applications. Where and How It Should Be Used. R. M. Leedy and S. A. Rosecrans. *Materials & Methods,* v. 37, Feb. 1953, p. 89-91.

Electrical conductivity, thermal expansion, joining, corrosion, and applications. (T1, P15, Al)

82-T. Which Metal Form for Jet Engine Blades? John L. Everhart. *Materials & Methods,* v. 37, Feb. 1953, p. 92-96.

Production of blades by forging, casting, machining, powder metallurgy, grinding, fabrication from sheet, deep drawing, rolling, and extrusion. Shows which alloys are applicable to the processes. Photographs and tables.
(T25, E general, F22, F23, G general, H general, SS, Ni, Co)

83-T. (English.) **The Use of Special Steels for Gears.** *Aciers Fins et Spéciaux Francais,* Dec. 1952, p. 27-30.

Types of alloy steels used in France for making gears. Heat treatments. (T7, J general, AY)

84-T. (English.) **Metallurgical Aspects of the Manufacture of Drilling Equipment.** *Aciers Fins et Spéciaux Francais,* Dec. 1952, p. 70-74.

Selection of steel for drilling tools and auxiliary equipment. (T6, AY)

85-T. (French.) **Contribution to the Study of "Rollodur' Steel for Tools of High Cutting Capacity.** Albert Collaud. *Von Roll Mitteilungen,* v. 11, July-Dec. 1952, p. 73-91.

Use of high-Cr toolsteel in place of 18-4-1 steel for high speed tools. Properties gained by heat treatment and castability. (T6, TS)

86-T. Strategic Metals in Aircraft Construction. R. Smallman-Tew. *Canadian Metals,* v. 16, Feb. 1953, p. 18, 20, 22.

Materials used in aircraft construction with emphasis on scarce items. Considers steel, light metals, and alloying components.
(T24, ST, Al, Mg)

87-T. Metallurgy for Nuclear Reactors. J. E. Burke. *General Electric Review,* v. 56, Mar. 1953, p. 6-9.

Shows that metallurgists must deal with strength, formability, thermal conductivity, and corrosion at high temperatures when selecting materials for nuclear reactors. Cost, availability, and interaction with neutrons must also be considered. Tables and diagrams. (T25)

88-T. How and Where to Use 430 Stainless. R. A. Lincoln and T. A. Pruger. *Iron Age,* v. 171, Feb. 26, 1953, p. 127-131; Mar. 5, 1953, p. 178-181.

Substitution problems and how to solve them. Photographs and tables. (T general, SS)

89-T. Nodular Iron Tackles Big Jobs. T. E. Eagan. *Steel,* v. 132, Mar. 16, 1953, p. 102-104.

Evaluates performance of ductile iron castings under actual service conditions. Photographs.
(T general, CI)

90-T. (Book—German.) **(Tires, Hubs and Solid Wheels.) Radreifen, Radscheiben, und Vollräder.** O. H. Lehmann. 94 pages. 1952. Verlag Stahleisen, Düsseldorf, Germany. 14.50 DM.

Production of wheels for railroads from the ingot to testing the finished product. Forging and rolling of tires, hubs and solid tires. A few pages deal with heat treatment and furnaces (continuous furnaces in Germany are successfully side-fired). Almost all the processes described can be applied to American railroad wheels and tires.
(T23, F22, F23, ST)

91-T. The Use of Stainless Steel in the Chemical Industry. W. B. Clarke. *Australasian Engineer,* Jan. 7, 1953, p. 59-65.

Design, fabrication, and production of stainless steel process vessels. Diagrams and photographs. (T29, SS)

92-T. Magnesium in Materials Handling Equipment. W. P. Sigler. *Modern Metals,* v. 9, Mar. 1953, p. 66-68.

Mg can be designed and constructed to solve a material handling problem where light weight is a factor, regardless of load capacities. Photographs. (T5, Mg)

93-T. Aluminum Banana Box. *Modern Metals,* v. 9, Mar. 1953, p. 69.

Boxes which are lightweight, clean, and durable. Photographs. (T29, Al)

94-T. Making a Fortune in Aluminum Office Chairs. *Modern Metals,* v. 9, Mar. 1953, p. 71-72.

Assembly-line production, anodizing section, painting, and finishing. Photographs. (T10, L general, Al)

95-T. Magnesium Roller Conveyors. *Modern Metals,* v. 9, Mar. 1953, p. 84.

Conveyors which are light-weight, strong, and nonsparking. (T5, Mg)

96-T. Magnesium's Sights Set High. A. W. Winston. *Steel,* v. 132, Mar. 30, 1953, p. 82-83.

Expansion of Mg industry through military applications and continued civilian use. Photographs. (T general, Mg)

97-T. (German.) **Modern Construction With Steel, Particularly in Industrial Construction.** Fritz Leonhardt. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 95, Jan. 11, 1953, p. 39-42.

Recent developments in reinforced concrete and use of thin-walled, concrete-filled steel tubes. Diagrams. (T26, ST)

98-T. Casting Diamond Drill Bits. *Canadian Metals,* v. 16, Mar. 1953, p. 47, 51.

Types of bits, manufacturing process, and bit forming. (T6)

99-T. Plastics: Machinery Market Booms. Extruders and Auxiliary Equipment. H. R. Simonds. *Iron Age,* v. 171, Apr. 9, 1953, p. 142-145.

Fabrication of equipment using iron, Al, and bronze castings; steel plates; toolsteel; low-carbon steel; and bars of SAE 1040, 3130, 3140, 4130, 4140; and Type 416 stainless. Photographs. (T5, CI, Al, Cu, TS, CN, AY, SS)

100-T. Wave-Guide Measurements in the Microwave Region on Metal Powders Suspended in Paraffin Wax. Joseph M. Kelly, Joseph O. Stenoien, and Dwight E. Isbell. *Journal of Applied Physics,* v. 24, Mar. 1953, p. 258-262.

A low-loss, high-refractive-index, artificial dielectric can be constructed by using powdered conductors if the particles are very small and possess a high electric polarizability. Graphs and tables. 10 ref. (T1, H general, Cu, Al, Zn)

101-T. Problems in Central-Station Nuclear Power. (Condensed from "Basic Problems in Central-Station Nuclear Power", by W. H. Zinn, *Nucleonics,* v. 10, Sept. 1952, p. 8-14.) *Metal Progress,* v. 63, Mar. 1953, p. 142-144.

Basic problems associated with building plants for central-station nuclear power to compete commercially with conventional sources of electrical energy, water power, and coal. (T25)

102-T. Aluminum Tanks and Pressure Vessels. E. V. Sharpnack, Sr. *Product Engineering,* v. 24, Apr. 1953, p. 183-185.

Shows why Al is replacing steel in food, chemical, aircraft, and transportation industries. Diagrams and tables. (T26, Al)

103-T. New Metals for the Atomic Age. *Steel Horizons,* v. 15, no. 1, 1953, p. 1-5, 26.

New combinations, and newly refined metals including U, Zr, and Ti. (T25, U, Zr, Ti)

104-T. Big Business From Grapes. *Steel Horizons,* v. 15, no. 1, 1953, p. 6-7.

Use of stainless steel in Welch's plants. (T29, SS)

105-T. A Stainless Spiral to Prosperity. *Steel Horizons,* v. 15, no. 1, 1953, p. 8-9.

Use of stainless steel for equipment in chemical and petroleum industries. Photographs. (T29, SS)

106-T. Kellogg Cooks With Stainless, Too. *Steel Horizons,* v. 15, no. 1, 1953, p. 18-19.

Use of stainless steel in the cereal industry. (T29, SS)

107-T. The First Atomic Piles and the French Effort. Part I. Pre-War and Wartime Work. Part II. Post-War Work. Jacques Allier. *Atomic Scientists News,* v. 2, new ser., Mar. 1953, p. 225-248.

Traces history of atomic power and progress made by France, Britain, U. S., Canada, and Norway. (T25)

108-T. Effects of Modern Design Trends on Ball Bearing Research. L. D. Cobb. *Lubrication Engineering,* v. 9, Apr. 1953, p. 78-80, 102-103.

Effects of steel properties and lubricant characteristics on bearing design. Graphs. (T7, ST)

109-T. Manganese Steel Against the Sea. *Edgar Allen News,* v. 32, Apr. 1953, p. 81-83.

Application of Mn steel in equipment for dredging rivers and harbors. Photographs. (T4, AY)

110-T. Keeping "Battle" Lines Open. *Inco Magazine,* v. 26, no. 1, 1953, p. 9-11.

Strength, electrical properties, and corrosion resistance of cable for field telephones. Photographs. (T1, SS)

111-T. Aluminum. *Light Metal Age,* v. 11, Apr. 1953, p. 12-15.

New Alcoa office building which features an Al paneled exterior. Photographs. (T26, Al)

112-T. Aluminum in Bicycles. *Modern Metals,* v. 9, Apr. 1953, p. 32-34, 36, 38.

Although at first a failure, Al is now being sucessfully used in bicycles. Advantages and application details. Photographs. (T10, Al)

113-T. Aluminum Plus Smart Design in Materials Handling Equipment. *Modern Metals,* v. 9, Apr. 1953, p. 54-56, 58.

Shows how 61S-T6 and 63S-T6 Al alloys are used in well-designed materials handling equipment. Result is decreased operating costs. Photographs. (T5, Al)

114-T. Power-Only Reactors. The Direct Approach to Economic Nuclear Power. George L. Weil. *Nucleonics,* v. 11, Apr. 1953, p. 12-15, 60.

Discussion and comparison of several different approaches to the development of economic nuclear power. Design, financing, and engineering considerations of a single-purpose plant. (T25)

115-T. The Properties of Germanium Phototransistors. John N. Shive. *Optical Society of America, Journal,* v. 43, Apr. 1953, p. 239-244.

Describes, summarizes, and compares properties of point contact, *p-n* junction, and *n-p-n* junction multiplier phototransistors. Graphs and diagrams. (T1, P15, Ge)

116-T. Old Buildings Modernized With Stainless Exterior. Earl R. Woodward. *Sheet Metal Worker,* v. 44, Apr. 1953, p. 67-69.

Fabrication and construction details of stainless-clad building. Photographs. (T26, SS)

117-T. Modern Construction Uses Old Idea. *Steel,* v. 132, Apr. 27, 1953, p. 140-141.

Modern equipment and skills needed to produce metal lath for current requirements. Photographs. (T26, G general)

118-T. Investigation of Power Connectors for Use Outdoors With Aluminum Conductors. H. R. Harrison and R. W. Honebrink. *Electrical Engineering,* v. 72, May 1953, p. 393-397.

Work that was done on power connectors for outdoor use. Conclusions are pertinent to design and use of SnCu alloy or Al power connectors. Photographs and graphs. (T1, Al, Cu, Sn)

119-T. Properties and Manufacture of Valve Steels for the Automotive Industry. J. Cameron. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 149-154.

Properties required for the ideal steel and factors governing the selection of their composition. Some of the steels in general use today, their manufacture, composition, and properties. (T21, AY, SS)

120-T. Investigation of Magnetic Mixtures for Clutch Application. W. P. Jones. *Power Apparatus and Systems,* Apr. 1953, p. 88-92.

Selection, preparation, method of evaluation, and results obtained with various mixtures of powdered iron, oil, and special additives. Diagrams and graphs. (T7, Fe)

121-T. Long Life Promotes Carbide Blanking Dies. Norman W. Oberg. *Steel,* v. 132, May 4, 1953, p. 100-102.

Advantages and benefits obtained from sintered WC blanking dies. Tables. (T6, W, C-n)

122-T. Tungsten in the Lamp Industry. George R. Moritz and W. E. Anderson. *Westinghouse Engineer,* v. 13, May 1953, p. 82-87.

Production of W wire and its application in electric lamps. Photographs. (T1, H general, W)

123-T. New Materials and Methods. Part I. Asbestos-Phenolic and Glass-Fibre Plastics. Methods of Moulding. Part II. Polyester, Phenolic and Foaming Resins. Metal Bonding. Integral Construction. Magnesium and Titanium Alloys. H. J. Pollard. *Aircraft Production,* v. 15, Apr. 1953, p. 126-131; May 1953, p. 183-192.

Includes tables, graphs, and photographs. (T24, Mg, Ti)

124-T. Copper-Aluminum Plates Show Great Promise. Charles W. Latham. *American Printer,* v. 134, May 1953, p. 38. 51-52.

Procedure for making Cu on Al bimetal plate from either negatives or positives. Shows that for long runs they are inexpensive, easy to make, and almost foolproof. (T9, L22, Cu, Al)

125-T. A High-Pressure Wire Gage Using Gold-Cnrome Wire. H. E. Darling and D. H. Newhall. *ASME, Transactions,* v. 75, Apr. 1953, p. 311-314.

Development of Au-Cr wire for pressure-sensing devices. Graphs. (T8, Au, Cr)

126-T. Metals and Modern Aircraft. J. Gordon Parr. *Discovery,* v. 14, May 1953, p. 157-161.

Considers "Duralumin", Mg alloys, Ti, and Mo with respect to creep, fatigue, and corrosion at high temperatures. Photographs. (T24, Q3, Q7, R general, Al, Mg, Ti, Mo)

127-T. The Use of Nickel in Valves. K. Jackson and R. O. Jenkins. *Electronic Engineering,* v. 25, May 1953, p. 208-211.

Some metallurgical problems in electronic tubes and how they are being solved with use of Ni. (T1, Ni)

128-T. Aluminium Plate Girders. *Engineering,* v. 175, May 1, 1953, p. 569.

Use of Al plate girders to reduce deadweight and to facilitate erection. (T26, Al)

129-T. Germanium in Coal Ash. K. Steward. *Gas Journal,* v. 274, Apr. 29, 1953, p. 279-280.

Presence in coal ash, uses in industry, and methods of determination. (T general, S11, Ge)

130-T. Selecting Materials for Small Assemblies. Leo B. Glaser. *Materials and Methods,* v. 37, May 1953, p. 101-103.

Shows that intelligent materials selection in the design stage leads to economical fabrication of small assemblies. Uses steel tape rule as example. (T8, ST)

131-T. Aluminum Mine Props Save Labor, Last Longer, Improve Safety in German Coal Mines. Max Stern. *Mining Engineering,* v. 5, May 1953, p. 492-493.

Use of Al props to replace timber in steep formations and longwall mining. Photographs. (T28, Al)

132-T. Magnesium. The Challenge to Offset? Part I. A. R. Tommasini. *Pacific Printer and Publisher,* v. 89, Apr. 1953, p. 25-26; May 1953, p. 23-24.

Advantages of using Mg plates. (T9, Mg)

133-T. Bi-Metal Plates Spell Economy. Charles W. Latham. *American Printer,* v. 134, Apr. 1953, p. 31, 66-68.

Describes the Cu-Al plate which shows promise for economical runs of 1-2 million. (T9, Cu, Al)

134-T. Automotive Engine Bearings. *Lubrication,* v. 39, May 1953, p. 61-76.

Properties required of a bearing material; use of white metal alloys, Sn- and Pb-base babbitts, Cd alloys, Cu-Pb alloys, impregnated Cu-Ni alloy, and Al alloys; bearing manufacture; lubrication and lubricants; and bearing life, failure, and corrosion. Micrographs, tables, photographs. (T7, Sn, Pb, Cd, Cu, Ni, Al)

135-T. Trays for Metal Treating. *Metal Trends,* v. 1, no. 2, p. 5-8.

Selection of material, tray design, and service performance. Diagrams. (T5, J general, SG-h)

136-T. From Tumblers to TV. *Metal Trends,* v. 1, no. 2, p. 9-12.

Shows that majority of glass parts produced are pressed or blown in metal molds. Use of metal molds to produce television tubes. Photographs. (T29, CI)

137-T. The Key to Atomic Power. Karl Cohen. *Nucleonics,* v. 11, May 1953, p. 10-13.

Shows that a low-cost reactor can be achieved by inventive design with relatively minor advances in present technology. Abundance and cost of uranium. 11 ref. (T25, A4, U)

138-T. Recent Advances in Reactor Technology. Alvin M. Weinberg. *Nucleonics,* v. 11, May 1953, p. 18-20.

Problems of breeding and achieving high flux. "Homogeneous reactor experiment", "materials testing reactor", and others are described in relation to these problems. (T25, U)

139-T. Clad Steel in Petroleum Equipment. Albert Hoersch, Jr. *Petroleum Processing,* v. 8, May 1953, p. 700-703.

When to use and when not to use clad steel in processing units. Welding and fabrication. Tables, diagrams. (T29, L22, CN, Ni)

140-T. (French.) **Use of Anodized Aluminum as Electrical Conductors in Aeronautical Equipment. Insulating and Refractory Characteristics of Alumina Coatings.** H. Bardot. *Métaux Corrosion—Industries,* v. 28, no. 329, Jan. 1953, p. 19-23.

Recommends that alumina insulated conductors be used on rotor windings, transformers, lifting electromagnets or in situations where the insulation is subjected to sudden high temperatures or humid atmospheres. (T1, Al)

141-T. (French.) **"Antilles" and "Flandre" Liners of the French Line.** *Revue de l'Aluminium,* v. 30, no. 196, Feb. 1953, p. 57-66.

Describes and illustrates 20,419-ton passenger ships in which large use of light metals was made. (T22, Al)

142-T. (French.) **Light Metal Coffering Device for the Cement Lining of**

Galleries and Tunnels. *Revue de l'Aluminium,* v. 30, no. 196, Feb. 1953, p. 80-81.
Coffering device, composed of light metal extrusions, offers lightness of wood with wear resistance and strength of steel. (T28, Al)

143-T. (French.) **Steel Cables and Electric Conductors for Overhead Lines.** O. Bachmann. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 1, Jan. 1953, p. 14-22.
Modern manufacturing and construction techniques. (T1)

144-T. (French and German.) **Aluminum Container for Use in Breweries.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 2-8.
General discussion of various types of Al containers used in Swiss breweries. Photographs. (T29, Al)

145-T. (French and German.) **Light-Metal Installations.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 9.
Al fermentation vats and other containers in Swiss breweries using the Nathan process. (T29, Al)

146-T. (French and German.) **Light-Metal Beer Casks.** Fritz Kutter. *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 10-24.
Corrosion resistant casks manufactured in Switzerland. (T29, Al)

147-T. (French and German.) **Ultra-Light Coaches of the Basel Streetcar Systems.** W. Würth. *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 25-27.
Advantages of newly constructed Al coaches include reduced maintenance cost due to mechanical and electrical simplifications; less wear on tracks; and shorter stops for receiving and discharging passengers. (T23, Al)

148-T. (French and German.) **Use of Aluminum in the Manufacture of Computing Machines.** *Aluminium Suisse,* v. 3, no. 1, Jan. 1953, p. 32.
The Curta calculating machine, a small pocket-size apparatus that adds, divides, multiplies, and subtracts. (T10, Al)

149-T. (German.) **Design Characteristics for Aluminum Structures.** W. Bleicher. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 91-101.
Designing with extrusions and fabrication of sheet structures. (T26, F24, Al)

150-T. (German.) **Aluminum Paint.** A. Müller. *Aluminium,* v. 29, no. 3, Mar. 1953, p. 106-110.
Composition, manufacturing process, and various uses. (T29, Al)

151-T. (German.) **Metals and Tissue.** Werner Bufe. *Werkstoffe und Korrosion,* v. 4, no. 3, Mar. 1953, p. 95-99.
Need for corrosion resistant metals, suitable for use in the human body as supports for injured parts. Advantages and disadvantages of using Ta. (T10, R7, Ta)

152-T. When You Drill an Oil Well. E. J. Tangerman. *American Machinist,* v. 97, May 25, 1953, p. 137-146.
Production of drilling bits. (T6, T28, AY)

153-T. Demand for and Supply of Tubular Goods. Present and Future. R. C. Zell. *American Petroleum Institute, Proceedings,* v. 32, sec. IV, 1952, p. 15-20; disc., p. 20-22.
Supply-and-demand of tubular steel goods for the oil industry and effects of increased production and deeper drilling. Recent developments. (T28, A4, ST)

154-T. Men, Materials, and Power. A Trio in Action. Norman L. Mochel. *ASTM Bulletin,* May 1953, p. 54-62.
Reviews development of steam turbines, possible future developments of gas and atomic-powered turbines. Use of various metals in turbine blading. Graphs, photographs. (T25, CN, SS, Ni, Al, Ti)

155-T. Light-Alloys in Mechanical Handling. *Light Metals,* v. 16, Mar. 1953, p. 87-88; Apr. 1953, p. 135-137; May 1953, p. 151-152.
Uses of Al and Mg in equipment devised for solving handling problems in industry and commerce. (T5, Al, Mg)

156-T. Zirconium for the Atomic Powered Submarine. *Modern Metals,* v. 9, May 1953, p. 42, 44.
Production, physical, and chemical properties. Photographs. (T22, T25, Zr)

157-T. Stainless Helps Cortisone Make Medical History. *Steel Horizons,* v. 15, no. 2, 1953, p. 12-13.
Stainless steel equipment. Photographs. (T10, SS)

158-T. Direct-Reading Design Charts for 24S-T3 Aluminum-Alloy Flat Compression Panels Having Longitudinal Formed Hat-Section Stiffeners and Comparisons With Panels Having Z-Section Stiffeners. William A. Hickman and Norris F. Dow. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note 2792 Mar. 1953 71 p.
Theoretical discussion including graphs and tables. (T24, Q28, Al)

159-T. (French and German.) **Intercontinental Airport, Zurich.** E. Müller.

Aluminium Suisse, v. 3, no. 2, Mar. 1953. p. 57-61.

Light-metal construction of new terminal; dust cover of passenger waiting hall; cabin-structure of control tower; and overhang above right-of-way to main entrance. Photographs, diagrams. (T26, Al)

160-T. (French and German.) **Light Metal Cranes.** W. Stadelmann. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 66-70.

Five and 10-ton cranes built completely of light metal. Photographs, diagrams. (T5, Al)

161-T. (French.) **Heat Resistant Materials. Fireproof Electrical Cables.** M. Gau. *Metaux Corrosion-Industries,* v. 28, no. 330, Feb. 1953, p. 75-78.

Diagrams. (T1, SG-h)

162-T. (German.) **Aluminum Roof Coverings.** H. Kentzler and J. Schroeder. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 31-35.

Chemical behavior and workability of corrugated-sheet and "Fural"-aluminum roofs. Photographs. (T26, Al)

163-T. (German.) **Aluminum Materials in Bridge Construction.** O. Lieb-ing. *Aluminium,* v. 29, no. 1-2, Jan.-Feb. 1953, p. 46-49.

Use of light metals, particularly Al, with steel. Compares weights, loadings, and construction costs. Graphs. (T26, Al, ST)

164-T. (German.) **Dam-Gate Guards for Power Plant at Birsfelden.** Alfred Gutknecht. *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 4, Apr. 1953, p. 59-62.

Qualities of materials used for guards; welding problems. Tables, photographs. (T4, K general, CN)

165-T. Frank Lloyd Wright's Concrete and Copper Skyscraper on the Prairie for H. C. Price Co. *Architectural Forum,* v. 98, May 1953, p. 98-105.

Skyscraper which incorporates Cu, glass, and masonry into its design. (T26, Cu)

166-T. Bucky Fuller Finds a Client. *Architectural Forum,* v. 98, May 1953, p. 108-111.

A geodesic dome constructed from Al and plastic. Illustrated. (T26, Al)

167-T. Nodular Iron, Plywood, and Hot Dip Coating Make Better Fans. Sidney H. Fedan. *Materials & Methods,* v. 37, June 1953, p. 106-109.

Materials are combined to meet the rigid requirements imposed on industrial cooling fans. Photographs. (T27, Fe)

168-T. New Vinyl Core in Steel Cable. *Modern Plastics,* v. 30, June 1953, p. 86-87.

Use and manufacture of resilient and chemical resistant vinyl cores in steel cables. Photographs. (T7, ST)

169-T. An Evaluation of Molybdenum Borides as Cutting Tools. Ira Binder and Arnold Roth. *Powder Metallurgy Bulletin,* v. 6, May 1953, p. 154-162.

Investigation of combinations of Mo_2B with newly discovered Mo_2NiB_2. Graphs. 9 ref. (T6, SG-j)

170-T. Architectural Hardware. New Use for Aluminum and Stainless Steel Investment Castings. H. A. Hietzmann. *Precision Metal Molding,* v. 11, May 1953, p. 28-29.

Description. (T6, E15, Al, SS)

171-T. Production of Cast Aluminum Molds for Forming Foam Rubber Products. Robert F. Dalton. *Rubber Age,* v. 73, May 1953, p. 211-212.

Making the mold and pouring the metal. (T29, E19, Al)

172-T. Light Alloy Bodywork. *Automobile Engineer,* v. 43, May 1953, p. 200-204.

Review of mass production practices in France. Use of Al in automobile bodywork, alloy composition, choice of alloy, and deep drawing techniques. Photographs. (T21, G4, Al)

173-T. Aluminum in Electrical Construction. R. R. Cope. *Consulting Engineer,* v. 2, May 1953, p. 34-37.

Uses of Al as a conductor and as a structural material. (T1, Al)

174-T. Open Hearth Screw Steels Replacing Bessemer. S. Feigenbaum. *Journal of Metals,* v. 5, June 1953, p. 796.

Production of free machining steels in the basic openhearth for automatic screw machine use. (T5, D2, CN)

175-T. How to Select the Proper Steel for Long, Productive Die Life. Stewart G. Fletcher. *Machine and Tool Blue Book,* v. 49, June 1953, p. 214-215, 218-220, 222, 224, 226, 228, 230, 232, 234-243.

Various types of steels and factors in selecting proper die steel for the job at hand. Photographs, tables. (T5, TS)

176-T. The Metal Zirconium and Its Place in Nuclear Power Plants. Edward C. Miller. *Metal Progress,* v. 63, May 1953, p. 67-74.

Problems in the development of atomic power from nuclear fission, particularly as to the nuclear, chemical, and mechanical requirements of the potential structural materials such as Zr. Review of some of the pioneering activities in the Zr program. Tables. (T25, Zr, U)

177-T. New Engineering Materials. *Product Engineering,* v. 24, June 1953, p. 139-145.

Use of powder metals, castings, tubing, Ti, ultra-thin metals, rubber, laminated plastics, technical ceramics, low-alloy permanent magnet materials, high-strength steels, rigid PVC, fluorocarbons, Al, silicones, large moldings, Zr, and composite metals. Photographs, tables. (T general, Zr, Ti, ST)

178-T. New Materials and Methods for Aircraft Construction. H. J. Pollard. *Royal Aeronautical Society, Journal,* v. 57, May 1953, p. 277-293; disc., p. 293-300.

Use of asbestos fibers and plastic; glass and cellulose fiber plastics; resins; Al and Mg alloys; and Ti. Photographs. 30 ref. (T24, Al, Mg, Ti)

179-T. (French.) Interest in High-Strength Steels in the Construction of Rolling Stock. H. Herbiet and C. Scailteur. *Ossature Metallique,* v. 18, no. 3, Mar. 1953. p. 170-177.

Principal applications and possible uses in railroad cars. Composition and mechanical properties of Belgian steel are compared with "Cor-Ten". Tables. (T23, ST)

180-T. (German.) Use of Aluminum in a Degreasing Plant for Semi-Finished Light Metal Extrusions. O. Weiler. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 441-442.

Construction. Advantages of Al for use with ethylene perchlorate. (T29, Al)

181-T. (German.) Base Metals in Electrotechnique. I. Influence of Metallurgical Investigation on Newest Development of Superpower Production and Transmission. A. Schwarz. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 268-271.

Cu and Al conductors. Tables. 32 ref. (T1, Al, Cu)

182-T. (German.) Precision Mechanics and Optics—A Typical German Industry. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 279-284.

General discussion on photography and moving pictures. Emphasizes use of brass in equipment. Photographs. (T9, Cu)

183-T. (German.) Lead in the Design of Modern Apparatus. Hans H. Hörger. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 117-122.

Use of Pb and its alloys for anticorrosive parts, coatings, platings, or linings of modern equipment. Photographs. (T29, R general, Pb)

184-T. Liquid-Metal-Cooled Power Reactor Looks Promising. *Electrical World,* v. 139, June 15, 1953, p. 114-118.

Report on water-cooled thermal converter and liquid-metal-cooled fast breeder reactors. Design, operating, and cost data. Diagrams, tables. (T25)

185-T. Transitors. New Use for Antimony? *Engineering and Mining Journal,* v. 154, June 1953, p. 99.

Possibility of using Al-Sb instead of Ge in transistors. (T1, Al, Sb, Ge)

186-T. Liquid-Metal Heat-Transfer System for Nuclear Power Plants. Thomas Trocki and D. B. Nelson. *Mechanical Engineering,* v. 75, June 1953, p. 472-476.

Test system designed, constructed and operated to demonstrate practicability of using Na and K for power-plant-scale heat transfer and steam generation. Diagrams. (T25, Na, K)

187-T. Industry Points Way to Nuclear Power. *Mechanical Engineering,* v. 75, June 1953, p. 481-485.

Different approaches to practicable nuclear-power plants of central-station size by four industry teams. Diagrams, tables. (T25)

188-T. Low-Cost Transportation With Aluminum Trolley Coaches. *Modern Metals,* v. 9, June 1953, p. 36, 38.

Advantages of using Al in electric buses. (T21, Al)

189-T. For the U. S. Navy: Lightweight Aluminum Diesels. *Modern Metals,* v. 9, June 1953. p. 68-70.

Efficiency resulting from use of Al throughout the engine structure. (T22, Al)

190-T. Fabricating Titanium for Airframes. F. Robert Kostoch. *Modern Metals,* v. 9, June 1953, p. 72, 74-76.

Reasons for use. Considers buckling, stretch forming, joining, and temperature problems. Photographs. (T24, Q28, G9, K general, S16, Ti)

191-T. Custom-Made Aluminum Roof. Roliton Rolls-It-On! F. L. Church. *Modern Metals,* v. 9, June 1953, p. 78-80; 82-83.

Advantages and profits from use of Al roofs. Photographs. (T26, Al)

192-T. LTF's Copper-Aluminum Bi-Metal Plates. Making Them From Negatives. *National Lithographer,* v. 60, June 1953, p. 54-55.

Procedure for making. (T9, Cu, Al)

193-T. Side and End Sheets Last 19 Years. *Railway Age,* v. 134, June 15, 1953, p. 116-117.

Data on construction and service of hopper cars after 19 years. (T23, AY)

194-T. Die Steels for Cold Extrusion. E. Johnson and E. Bishop. *Sheet Metal Industries,* v. 30, June 1953, p. 490-499.

Quality, heat treatment, hardness, hardenability, resistance to tempering, toughness, abrasion resistance, and ease of machining and grinding. Tables, graphs. (T5, G5, TS)

195-T. High Speed Manufacture of Steel Drums. Alan Heathcote. *Welding and Metal Fabrication,* v. 21, June 1953, p. 197-200.

Fabrication of mild steel. Photographs. (T29, CN)

196-T. (French and German.) **Calculation and Design for Radiant Heating With Copper Tubing.** A. Kollmar. *Pro-Metal,* v. 6, no. 32, Mar. 1953, p. 148-156.

Calorific emissions of heating surfaces and some technical remarks about installation. Diagrams, tables. (To be continued.) (T27, Cu)

197-T. (German.) **Bimetallic Casting for Lead-Bronze Sleeve Bearings.** H. Mann. *Giesserei,* v. 40, no. 11, May 28, 1953, p. 277-290.

Various processes for production of new kind of sleeve bearing which can withstand greater loads. Photographs, diagrams. 18 ref. (T7, E general, Pb)

198-T. (German.) **The Automobile Industry as a User of Metals.** H. H. Hansen. *Metall,* v. 7, nos. 9-10, May 1953, p. 366-368.

Use of metals and their supply. Graphs. (T21)

199-T. (German.) **Technology of Materials for Electrical Contacts.** Albert Keil. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 166-170.

Selection, shaping, and application of materials. Photographs. 9 ref. (T1, Ag, Cu, Pd, W, CN)

200-T. (German and French.) **Steel Frame for the New Jelmoli Building in Zürich-Oerlikon.** *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 5, May 1953, p. 85-88.

Structural-steel parts are illustrated. (T26, ST)

201-T. (Hungarian.) **Electrical Contacts.** Ferenc Bartfai. *Magyar Hiradastechnika,* v. 3, no. 7-9, July-Sept. 1952, p. 117-120.

Shape of contacts. Emphasizes properties of various metals, such as Au, Ag, Pt, Pd, Ir, Rh, Ru, and their alloys, with special regard to their application in relays. (T1, Au, Ag, Pt, Pd, Ir, Rh, Ru)

202-T Advantages of Steel Tanks as Distribution Reservoirs. C. Kenyon Wells. *American Water Works Association, Journal,* v. 45, June 1953, p. 569-579.

Construction, water-tightness, flexibility of operation, appearance, safety, maintenance, cost, and an example of successful installation. (T26, ST)

203-T. A Better Landing Gear Strut for the Boeing B-47 Bomber. *Automotive Industries,* v. 109, July 1, 1953, p. 96, 102, 104.

How Al alloy forging reduces weight, and saves time and material. Photographs. (T24, F22, Al)

204-T Aluminum Light Baffle Design Is Improved. *Bureau of Ships Journal,* v. 2, July 1953, p. 37.

By design improvement the costs of manufacturing and assembling standard 100-watt overhead light fixtures have been reduced. (T1, Al)

205-T. Custom Engineered Structures for Chemical Plant. G. H. Crase, Jr. *Canadian Chemical Processing,* v. 37, June 1, 1953, p. 36, 38-40.

Use of carbon steel, stainless steel, and Al in fabrication of chemical vessels. (T29, Al, SS, CN)

206-T. Fabricating Sheet Metal. *Canadian Metals,* v. 16, June 1953, p. 44, 46.

Sheet metal flooring, panelling, and other constructional sections and products fabricated in a modern plant. Photographs. (T26)

207-T. Field Fabrication of Storage Vessels. G. H. Crase, Jr. *Canadian Metals,* v. 16, June 1953, p. 49-50.

Assembling and erecting stainless steel and aluminum storage tanks in the field. (T26, Al, CN, SS)

208-T. Aluminum Shaking Conveyor. Harold Davis. *Coal Age,* v. 58, July 1953, p. 78-80.

The conveyor, its construction, use, economy and corrosion resistance. Photographs. (T28, R general, Al)

209-T. Engineering and Technical Problems of Atomic Power. Walter H. Zinn. *Combustion,* v. 24, June 1953, p. 49-52.

Fuel supply and probable costs, reactor types, moderator and structural materials, coolants, corrosion problems, shielding, and what has been accomplished to date in the actual production of power. Tables. (T25)

210-T. Development of Power From Atomic Energy in Canada. I. N. MacKay. *Engineering Journal,* v. 36, June 1953, p. 699-701.

Functioning of a nuclear reactor in respect to fuels, products, problems involved, and probable costs. Tables. (T25)

211-T. The Lithographic Image. Chemistry vs. Hard Metal. Norman A. Mack. *Graphic Arts Monthly,* v. 25, June 1953, p. 65-66, 68.

Pros and cons of using metal or chemical litho plates. (T9)

212-T. Piping Liquid Metal. *Heating Piping & Air Conditioning,* v. 25, July 1953, p. 112-113.

Circulation of liquid Na by electromagnetic pump through 8-in. stainless steel piping. Diagram, photographs. (T29, R6, Na, SS)

213-T. Zirconium. Elliot L. Lewis. *Light Metal Age,* v. 11, June 1953, p. 8-9.

How practical commercial production was spurred by use in atomic submarine. (T25, Zr)

214-T. Aluminum Hangar. Large Sub-Assembly Units Prefabricated. Peter Stevens. *Light Metal Age,* v. 11, June 1953, p. 10-11, 34-35.

Fabrication. Illustrations. (T26, Al)

215-T. Aluminium Cans. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, June 20, 1953, p. 73-75.

New containers designed to replace the "tin can". Diagrams. (T29, Al)

216-T. Engineering Uses of Aluminium Alloys. Some Recent Interesting Examples. *Metallurgia,* v. 47, June 1953, p. 312-314.

Uses for plate girders and cable sheathing. Welding Al. Photographs. (T26, T1, K general, Al)

217-T. Characteristics of Metals for Jet Engines. *Metal-Working,* v. 9, July 1953, p. 16-19.

Oxidation, high-temperature strength loss, and corrosion. Considers Cr-Ni and Cr steels, and Ni and Co-base alloys. Graphs. (T25, R general, Q23, SS, SG-h)

218-T. Effect of Galvanized Iron on Some Tree Seedlings. J. Hawkins and D. I. Cameron. *Nature,* v. 171, May 30, 1953, p. 977-978.

Effects of the containers used to grow seedlings. (T3, Zn, CN)

219-T. Materials. George E. Evans. *Nucleonics,* v. 11, June 1953, p. 18-26.

Materials used in nuclear reactors. Includes Al, Be, Mg, Mo, Ni, Ta, Ti, V, W, Zr, 18-8 stainless steel, and Inconel "X". Photographs, tables. 129 ref. (T25, Al, Be, Mg, Mo, Ni, Ta, Ti, V, W, Zr, SS)

220-T. (German.) Bearing Equipment in the Socialized Rubber Industry. K. Platz. *Chemische Technik,* v. 5, no. 2, Feb. 1953, p. 106-107.

Substitutes for scarce bearing metals. Stone bearings are mentioned for high wear resistance. Photographs, diagrams. (T7, SG-c)

221-T. Steel in Drainage Projects. L. E. Chamberlain. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 33-68.

Use of steel in sheet piling for cofferdams and gates in locks and dams. Considers Fort Randall Dam project. Photographs, diagrams. (T4, ST)

222-T. Prestressed Concrete. W. O. Everling. *American Iron and Steel Institute, Regional Technical Meetings,* 1953, p. 85-102.

Steel reinforcement of prestressed concrete. Graphs, photographs. (T4, T26, ST)

223-T. The Automobile Industry. Robert Cass. *Analysts Journal,* v. 9, June 1953, p. 69-70.

Use of metals in automobiles. (T21, Cu, Ni, Al, Ti, SS)

224-T. Copper Contacts Can Be Operated Above Standard Temperature Limits. H. A. Adler and K. H. Wadleigh. *Electrical World,* v. 140, July 27, 1953, p. 96-98.

Results of 18-month continuous test of bolted joints on Cu bus bars and lugs pressed on Cu rods and cables. (T1, K13, Cu, Ag, Sn, AY, ST)

225-T. Basic Principles to Support Aluminum and Copper Buses. Morris Brenner. *Electrical World,* v. 140, July 27, 1953, p. 118-119.

Support arrangements. Photographs, diagram. (T21, Cu, Al)

226-T. Aluminum Tubing in Instrument Air Connections. D. W. Humphrey. *Modern Metals,* v. 9, July 1953, p. 62, 64-65.

Tubing installation; joining techniques including soldering, pressure welding, and use of resins; corrosion prevention; and cost compared with cost of Cu. Photographs. (T8, K general, R10, Al)

227-T. A Steel Picture-Tube for Television Reception. J. de Gier, R. Hagenberg, H. J. Meerkamp Van Embden, J. A. M. Smelt, and O. L. van Steenis. *Philips Technical Review,* v. 14, Apr. 1953, p. 281-291.

Brief history of metal discharge tubes. Development of a tube with steel cone and window of new glass. Diagrams, photographs. 12 ref. (T9, Cu, SS, Pb, CN)

228-T. The Use of Coil Tinplate in the Production of Condensed Milk Cans. *Sheet Metal Industries,* v. 30, July 1953, p. 549-551.

Apparatus and procedure. Diagrams, photographs. (T29, Sn, CN)

229-T. Rynalloy Developed as Heat, Corrosion Resistant Cast Alloy for Aircraft. Wilson G. Hubbell. *Western Metals,* v. 11, July 1953, p. 68-69.

Use of Ni alloy for ball-and-socket joints. Photographs. (T24, R general, Ni)

230-T. Huge Steel Dock Static Test Facility for Navy Planes Built

by Convair. *Western Metals,* v. 11, July 1953, p. 70.

Equipment for testing structural features of Navy flying boats. (T26, ST)

231-T. Aluminum Sheathed Cables. P. J. Croft. *Wire and Wire Products,* v. 28, July 1953, p. 682-687, 725.

History of Al sheathing for cables. Fields of application. Tables, graphs. (T1, Al)

232-T. (Dutch.) **Metals to be Used at High Temperatures in the Electric Furnace.** C. H. Luiten. *Smit Mededelingen,* v. 8, no. 1, Jan.-Mar. 1953, p. 29-34.

Specific properties of heat resistant alloys which are of practical importance for applications in electric furnaces. Particular attention is paid to the attack at high temperatures by fluxes, heat treatment salts, liquid metals, metal oxides, and different gas atmospheres. Some preventive measures. Graphs, table, photographs. (T5, R6, Cr, Ni, CN, AY)

233-T. (Book.) **Manual for the Design of Ferrous and Non-Ferrous Pressure Vessels and Tanks. Ed. 4.** Karl Siemon. 284 p. 1952. Edward Brothers, Ann Arbor, Mich. $3.85.

Part 1: Properties and fabricating characteristics of the principal ferrous and nonferrous metals. Part 2: A detailed treatment of the design of pressure vessels and tanks. (T26)

234-T. Postwar Developments in Aluminum Foil Packaging. Gene Bremer. *American Paper Converter,* v. 27, Aug. 1953, p. 18-20.

Extended use and production. (T10, Al)

235-T. How to Select Your Materials. H. W. van der Hoeven. *Chemical Engineering,* v. 60, Aug. 1953, p. 202-208.

Guide to the proper selection of materials for chemical processing equipment. Properties of various metals used in the chemical industry. Photographs, tables. (T29, Ni, Ag, ST)

236-T. Aluminum Comes of Age in a Nuclear World. N. F. Ritchey. *Iron Age,* v. 172, July 30, 1953, p. 94-97.

Use of Al in conjunction with U for atomic energy applications. (T25, Al, U)

237-T. Light Alloy Ladder for Fire-Fighting. *Light Metals,* v. 16, July 1953, p. 227.

Described and illustrated. (T10, Al)

238-T. New Flour Milling Plant in Light Alloy. *Light Metals,* v. 16, July 1953, p. 228-229.

Use of Al in the equipment. Photographs. (T29, Al)

239-T. Spring Design. XX. W. R. Berry. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 316-319.

Detailed examination of factors involved in the design of cantilever and laminated springs. (T7, ST)

240-T. Doing More With Less Nickel. Ernest A. Schoefer. *Steel,* v. 133, Aug. 3, 1953, p. 134-135.

Research on use of Ni alloys. Graphs, table, photograph. (T general, Ni, Cr)

241-T. Better Bridges By-Pass Tougher Traffic Tangles. *Welding Journal,* v. 32, July 1953, p. 627-630.

Uses of various alloy steels in bridge construction. Photographs. (T26, AY)

242-T. (English.) **Light Metal Wheel Centers of Tramcars and Low Temperature Investigations Connected With Them.** I. Baranszky-Job. *Acta Technica Academiae Scientiarum Hungaricae,* v. 5, no. 2, 1952, p. 183-205.

Production of Al railway wheel centers. Tables, graphs. 20 ref. (T23, Al)

243-T. (French.) **Aluminum Roofs Selected for Swiss Freight Cars.** *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 138-140.

Use of Al alloys in roofs. Photographs, diagrams. (T23, Al)

244-T. Use of Aluminum in New Building Construction of Cegedur. Andre Chevrier. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 155-159.

Use of Al for large sash windows, partitions, heating and lighting fixtures, roofing, and interior decorations. Photographs. (T26, Al)

245-T. (French.) **Electronic Dust Remover "Precipitron S-W".** Maurice Victor. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 161-163.

Electromagnetic dust filters made of Al. Photographs. (T27, Al)

246-T. (French.) **Hangar of the "Comet".** Maurice Victor. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 164-167.

Use of Al in the construction of a large aviation hangar. Photographs, table. (T26, Al)

247-T. (French.) **Evaluating the Quality of Zirconium Powder Used in the Production of Vacuum Tubes.** H. Figour and H. Bonnel. *Vide,* v. 8, no. 44, Mar. 1953, p. 1305-1306.

Quality of Zr used as a getter in electron tubes. Diagram, table. (T1, H11, Zr)

248-T. (German.) **Steel Wires for Reinforced Concrete.** Fritz Schwier.

Stahl und Eisen, v. 73, no. 14, July 2, 1953, p. 924-925.

Abstract of an article in *Beton u. Stahlbeton,* v. 47 (1952), p. 201-207, on the use of high-strength steel wires in modern reinforced concrete construction. (T26, ST)

249-T. (Russian.) **Enlarge the Use of New Brands of Steel.** M. Pridantsev. *Za Ekonomiiu Materialov,* no. 3, Oct. 1952, p. 36-43.

Substitutes for various highly alloyed steels. (T general, AY)

250-T. Efficient Structures in Aluminium. M. Bridgewater. *Metallurgia,* v. 48, no. 285, July 1953, p. 11-17.

Significant differences between Al and steel as structural media; latest views on the design of light alloy members. Graphs, photographs, diagrams. (T26, Al, Cn)

251-T. More Carbon for the Steelmaker. J. S. Copley and E. F. Sipp, Jr. *Steel,* v. 133, Aug. 10, 1953, p. 105, 108.

Applications of C other than as ingredient in steel. Photographs. (T general, C)

252-T. (French.) **Use of Zinc Alloys for the Manufacture of Pressing Tools.** R. Lébre. *Métallurgie et la Construction Mécanique,* v. 85, no. 4, Apr. 1953, p. 283, 285, 287, 289.

Brief outline of the possibilities of Zn-base alloys for manufacturing punches, dies, and molds intended for cutting and stamping of sheets. Photographs, tables. (T5. Zn)

253-T. (French.) **Davey Paxman 12 YHA Diesel of the British Navy.** Leonce Keuleyan. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 108-109.

Davy Paxman 12 YHA model develops 800 hp. at 1250 rpm. It is built almost entirely of light alloy. Photographs, diagrams. (T22, EG-a)

254-T. (French.) **Exploration of the Submarine World.** Jacques-Yves Cousteau. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 115-123.

Use of light alloys in equipment for underwater mobility. Diagrams, photographs. (T22, Al)

255-T. (French.) **Working Pressure of Aluminum and Light Alloy Tubes.** Maurice Besnard and Rene Calais. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 124-125.

Table which makes it possible to define the conditions of use of Al and light alloy tubes. Table. (T general, Al)

256-T. (French.) **Magnesium Hoisting Installations.** Pierre Le Bihan. *Revue de l'Aluminium,* v. 30, no. 199, May 1953, p. 205-208.

Use of Mg in the field of lifting equipment. Photographs, diagrams. (T5, Mg)

257-T. (French.) **High-Quality Steels Intended for Welded Metallic Construction.** H. Herbiet. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 368-374.

Factors affecting weldability and strength of welded structures. 4 ref. (T26, K9, ST)

258-T. (German.) **Aluminum as Material for New Light-Metal Articulated Trains.** W. Bleicher and A. Szymanski. *Aluminium,* v. 29, no. 6, June 1953, p. 245-247.

Use of Al-Mg-Si, Al-Mg, and Al-Mg-Mn alloys in railway coaches. Tables, diagrams. (T23, Al)

259-T. (German.) **Electrical Measurements With Gold-Chromium Standard Resistance.** Alfred Schulze. *Umschau in Wissenschaft und Technik,* v. 53, no. 12, June 15, 1953, p. 358-359.

Difficulties and achievements in developing high-precision Au-Cr resistances. Photographs. (T1, Cr, Au)

260-T. (German.) **Magnetic-Powder Couplings Protect Motors.** W. Lanze. *Umschau in Wissenschaft und Technik,* v. 53, no. 12, June 15, 1953, p. 361-363.

New clutches. Photographs, diagrams. 4 ref. (T21, H general)

261-T. (German.) **Construction of Industrial Furnaces.** Walter Stuhlmann. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 586-589.

Modern melting, heat treating and drying furnaces and their accessories based on the latest principles of heating efficiency. Diagram, photographs. 54 ref. (T5, E10, J general)

262-T. (Italian.) **Aluminum in the Production of Packaging Materials in Italy.** E. Hugony. *Alluminio,* v. 22, no. 1, Jan. 1953, p. 9-21.

Properties and uses of Al and its alloys as a packaging material. Tables, photographs. 8 ref. (T10, Ti, Pb)

263-T. Russian.) **Economical Ratio of Aluminum and Steel Sections in Aluminum-Steel Conductors.** A. A. Glazunov and G. M. Rozanov. *Elektrichestvo,* no. 5, May 1952, p. 10-15.

Suggests new construction with increased ratio of Al and steel sections. Corresponding change in the standards GOST 839-41. Tables. 5 ref. (T1, Al, ST)

264-T. Junction Diode Operates Well at High Temperatures. *Chemical and Engineering News,* v. 31, Aug. 10, 1953, p. 3284, 3286.

Diode of high-purity Si alloy. Does not replace Ge diodes. (T1, Si)

265-T. Steam Piping and Valves for 1100° F. Service. Frank A. Ritchings and Sabin Crocker. *Heating, Piping & Air Conditioning,* v. 25, Aug. 1953, p. 84-88.

Paper presented at the 1953 semi-annual meeting of the American Society of Mechanical Engineers, Los Angeles. Design of piping for large steamturbine boiler units. (To be continued.) (T25)

266-T. Petroleum Industry Finds Many Uses for Aluminum. Floyd A. Lewis. *Petroleum Engineer,* v. 25, Aug. 1953, p. A47-A48, A50, A52.

Applications. (T general, Al)

267-T. Oxidizing Catalyst at Peak Performance. Eugene B. Brien. *Petroleum Engineer,* v. 25, Aug. 1953, p. C15-C16.

Use of Pt alloy. Photographs. (T29, Pt)

268-T. (German.) **Aluminum and the German Transport Exposition, Munich, 1953.** H. Kessler. *Aluminium,* v. 29, no. 6, June 1953, p. 241-244.

Several applications of Al to transport problems, e.g., frames, shipstacks, wheel rims, wheel disks and cylinder heads. Photographs. (T22, T23, Al)

269-T. Ornamental Aluminum Casting. *Canadian Metals,* v. 16, Aug. 1953, p. 22, 24.

Use of aluminum castings in ornamental work. Photographs. (T9, Al)

270-T. Aluminum Construction. *Canadian Metals,* v. 16, Aug. 1953, p. 52, 54.

Constructional aspects of Al in building, electrical and transportation industries. Photographs. (T general, Al)

271-T. Modern Ferrous Materials for Springs. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 25, Aug. 1953, p. 71-74.

Principal modern ferrous materials for springs, their characteristics and suitability for particular purposes. (T7, AY, SS)

272-T. Industrial Uses of the Rarer Metals and Their Alloys. A. R. Myhill. *Mechanical World and Engineering Record,* v. 133, Aug. 1953, p. 353-357.

Uses of Be, Bi, Cb, Cd, Co, Ge, Pt, Pd, Ir, Rh, Ru, Os, Mg, Ti, W, Ta, V, Mo, and Zr. (T general, EG-b)

273-T. Efficient Structures in Aluminium. M. Bridgewater. *Metal Industry,* v. 83, Aug. 7, 1953, p. 105-108.

British specifications and design data for Al structural members. Photographs, diagrams. (T26, S22, Al)

274-T. The Building of a Nuclear Reactor. B. A. Rogers. *Metal Progress,* v. 64, July 1953, p. 92-96.

General review of properties of U affecting construction of a reactor. Diagrams. (T25, U)

275-T. Aluminum on the Farm. *Modern Metals,* v. 9, Aug. 1953, p. 35-36, 38-40, 42-43.

Applications of Al in farm equipment. Photographs. (T3, Al)

276-T. Good Design in Gas Meters. *Modern Metals,* v. 9, Aug. 1953, p. 52-53.

Use of Al die castings for meters. (T8, Al)

277-T. Dome of the Future. *Modern Metals,* v. 9, Aug. 1953, p. 64, 66.

Use of Al struts to construct dome in rotunda of Ford plant. Photographs. (T26, Al)

278-T. Aluminum Roofing. Custom Made at the Job. *Sheet Metal Worker,* v. 44, Aug. 1953, p. 88, 90.

Installation of tailor-made Al roofing. (T26, Al)

279-T. Unique Application of Sheet Copper Roofs on Home. James F. Redding. *Sheet Metal Worker,* v. 44, Aug. 1953, p. 82, 124.

Technique of combining small soft sheet Cu panels which are locked to form a whole coverage. (T26, Cu)

280-T. Stainless Steel Industrial Equipment. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 272-276.

Fabrication of a wide range of stainless steel equipment. Material preparation, metallic arc welding process, grinding and finishing. Photographs. (T general, K1, G18, SS)

281-T. The Use of Structural Quality Steel in Pressure Vessels. I. E. Boberg. *Welding Journal,* v. 32, Aug. 1953, p. 413s-416s.

Evaluates available steels as to comparative properties and suitability for welded pressure vessel construction. Tables. (T26, ST)

282-T. (German.) **Corrugated and Ornamental Sheets.** *Aluminium Ranshofen, Mitteilungen,* 1953, no. 1, Apr. p. 13.

Corrugated sheets produced from "Dekoral TT", a new ornamental sheet of pure Al and a new knurled foil for insulation purposes. Photograph, diagrams. (T9, Al)

283-T. (German.) **Hardened Lead Metals for Bearings.** R. Weber. Paper from "Werkstoffe für Gleitlager." Springer-Verlag, OHG Berlin, p. 97-132.

Composition, physical, mechanical and chemical properties and metallurgical behavior. Graphs, tables. (T7, Pb)

284-T. (German.) **Alloys Containing Cadmium as the Principal Component.** R. Weber. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 133-151.

Composition, physical, mechanical and chemical properties and metallurgical behavior. Use for bearings. Graphs, tables. (T7, Cd)

285-T. (German.) Alloys Containing Aluminum and Magnesium as Principal Components. W. Bungardt. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 152-203.

Alloying suggestions. Formation of light alloy bearings. Graphs, tables, micrographs. (T7, Al, Mg)

286-T. (German.) Alloys Containing Silver as the Principal Component. H. Mann. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 204-209.

Development and structure of Ag alloys for bearings. (T7, Ag)

287-T. (German.) Alloys Containing Zinc as the Principal Component. E. Martin. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 210-232.

Composition, physical and mechanical properties and results of tests made on the bearings. Graphs, tables. (T7, Zn)

288-T. (German.) Alloys Containing Copper as the Principal Component. H. Mann. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 233-318.

Use of bronze and red, yellow, and Pb brasses for bearings. Graphs, tables, micrographs. (T7, Cu, Pb)

289-T. (German.) Sintered Metal. H. Wiemer. Paper from "Werkstoffe für Gleitlager." Springer-Verelag OHG, Berlin, p. 319-356.

Composition, physical, mechanical and friction properties of powdered metal bearings. Requirements for impregnation and examples of application. Graphs, tables, micrographs. (T7, H general, Cu, Sn, Al)

290-T. (German.) Cast Iron. W. Meboldt and R. Kühnel. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 357-364.

Mechanical properties, machining and lubrication of cast iron bearings. Diagrams. (T7, CI)

291-T. (German.) Alloys Containing Lead and Tin as Principal Components. W. Bungardt. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 35-96.

Composition of principal white metals for bearings. Structure and metallurgical, physical and mechanical properties. Graphs, tables, micrographs. (T7, Pb, Sn)

292-T. The Trend of Complete Aircraft and Guided-Missile Structures Toward Reinforced Plastics. William E. Braham. *Aeronautical Engineering Review*, v. 12, Sept. 1953, p. 37-40, 45.

Compares properties of various metals and plastics for use in aircraft. Graphs. (T24)

293-T. AMC to Test All-Magnesium F-80C. Irving Stone. *Aviation Week*, v. 59, Sept. 28, 1953, p. 28-30.

All-Mg structure of two types of light aircraft. Photographs. (T24, Mg)

294-T. Printing Metals. I. The Elementary Metals and Basic Alloys and Their Working Properties. Leslie G. Luker. *British Printer*, v. 66, Sept.-Oct. 1953, p. 64, 65-66.

Data on Pb, Sb, and Sn. Photomicrographs. (T9, Pb, Sb, Sn)

295-T. Aluminum-on-Steel Bearings. J. B. Mohler. *Diesel Power*, v. 31, Sept. 1953, p. 38-41.

High-strength bearing alloys; design data on Al-lined steel bearings. Photographs, tables, micrographs. (T7, Al)

296-T. Steam Piping, Valves for 1100° F. Service. Frank A. Ritchings and Sabin Crocker. *Heating, Piping & Air Conditioning*, v. 25, Sept. 1953, p. 82-88.

Reviews existing data and speculates on whether low-alloy content ferritic steels could be made to serve the purpose. Graphs, tables. 32 ref. (T27)

297-T. Developments in Steel Castings in the Heavy Power Plant Industry. F. Buckley. *Institution of Mechanical Engineers, Proceedings*, sec. A, v. 167, no. 2, 1953, p. 177-183; disc., p. 183-187.

Developments in the science of foundry production and practice. Trends in the application of castings in heavy prime movers and power generators. Photographs, diagrams. (T25, E general)

298-T. Aluminum Alloys Make Good Bearings. D. B. Wood. *Iron Age*, v. 172, Sept. 10, 1953, p. 168-169.

Photographs. (T7, Al)

299-T. Aluminum-Antimony Alloy Has Wide Applications in Electronics. Elliot L. Lewis. *Light Metal Age*, v. 11, Aug. 1953, p. 11, 28.

Use to replace Ge and Si in transistors, rectifiers and other electronic devices. (T1, Al, Sb)

300-T. Making Precision Roller Chain. *Machinery (London)*, v. 83, Aug. 28, 1953, p. 415-422.

Equipment and techniques developed for bush and rivet manufacture and various finishing processes. Photographs. (T7)

301-T. A New Non-Ferrous Die Material. *Machinery (London)*, v. 83, Sept. 18, 1953, p. 569-571.

Properties and advantages of new Al bronze which has no affinity for other metals. Dies are particularly suited for forming stainless steels and Nimonic alloys. Photographs, diagrams. (T5, G general, Al, SS, Ni)

302-T. Metal-Clad Laminates Used in Printed Circuitry. Norman A. Skow. *Mechanical Engineering,* v. 75, Sept. 1953, p. 709-711, 714.

Materials, bonding, properties of Cu sheets, etching, fabrication, assembly, economy and applications. Photographs. (T1, K11)

303-T. Non-Ferrous Metals in Chemical Engineering. *Metal Industry,* v. 83, Sept. 4, 1953, p. 182-191.

Articles on "Copper and Copper Alloys", S. Baker; "Lead and Lead Alloys", D. S. Laidler; "Wrought Nickel-Molybdenum-Iron"; "Silver and the Platinum Metals", J. M. Pirie; and "Aluminium and Its Alloys", D. C. G. Lees. Photographs, tables. (T29, Cu, Pb, Ni, Ag, Al)

304-T. 100 Engineers Evaluate Atomic Power Plants. *Metal Progress,* v. 64, Aug. 1953, p. 97-107.

Studies made by four industrial groups on apparatus to produce Pu and power. Photographs, diagrams. (T25, Pu)

305-T. New Wheels for Faster Freight. *Metal Trends,* v. 1, no. 3, 1953, p. 1-6.

Development of 1.5% carbon freight car wheels. Graph, photographs. (T23, CI)

306-T. Big Aluminum Containers in Switzerland. Edwin J. Zimmerli. *Modern Metals,* v. 9, Sept. 1953, p. 33-36.

Containers range in size from small food cans to giant beer vats. Photographs. (T29, Al)

307-T. What's Ahead for Titanium Stampings. Carter C. Higgins. *Modern Metals,* v. 9, Sept. 1953, p. 38, 42.

Recent progress and outlook. Chief problem is high cost. Photographs. (T general, G3, Ti)

308-T. Boeing's Mighty Midget. *Modern Metals,* v. 9, Sept. 1953, p. 44, 46.

Small gas turbine made mostly of Al. Photographs. (T25, Al)

309-T. Aluminum in a Vegetable Juicer. *Modern Metals,* v. 9, Sept. 1953, p. 48, 52.

Al is nontoxic, resists fruit and vegetable acids, and is cheaper than stainless steel. Photographs. (T29, Al, SS)

310-T. Calenders and Calender Rolls Today. Albert Seaton. *Paper Trade Journal,* v. 137, Oct. 2, 1953, p. 14-16, 18.

Casting and grinding of cast iron calender rolls for papermaking machines. Photographs, diagram. (T29, G18, E general, CI)

311-T. Guide for Selection of Carbon Steel Bars. I. G. P. Witteman. *Steel,* v. 133, Sept. 14, 1953, p. 104-107, 113.

Factors influencing proper selection to fit various needs. Photographs. (T general, CN)

312-T. Getting More for Your Steel Dollar. A. F. Stuebing. *Steel,* v. 133, Oct. 5, 1953, p. 90-92.

Advantages and savings using high-strength, low-alloy steels for transportation equipment. Photographs. (T21, T22, T24, AY)

313-T. Jet Engines Put Heat on Metals. William P. Brotherton. *Western Machinery and Steel World,* v. 44, Sept. 1953, p. 101-105.

Applications of heat resistant alloys in jet engines. Photographs, diagrams. (T25, SG-h)

314-T. Zirconium. From Rarity to Reactors. *Westinghouse Engineer,* v. 13, Sept. 1953, p. 171-173.

Properties and uses. Photographs. (T25, Q general, Zr)

315-T. (Czechoslovakian.) **Alloys for Fountain Pen Tips.** Jan Korecky. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 401-403.

Production of nibs without precious metals. Diagrams, micrographs. (T10, EG-c)

316-T. (French.) **Use of Aluminum in Electric Machines Operating on Alternating Current.** René Daguet. *Revue de l'Aluminium,* v. 30, no. 200, June 1953, p. 236-240.

Use of Al windings in electric motors. Photographs, diagrams. (T1, Al)

317-T. (French, German.) **Aluminum in the Construction of Motor Boats.** Emil Schacher. *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 111-118.

Innovations in the construction of small ships in Switzerland. Photographs. (T22, Al)

318-T. (French, German.) **Installation and Calculation of Copper-Tube Radiant Heating.** A. Kollmar. *Pro-Metal,* v. 6, no. 33, June 1953, p. 167-183.

Pressure gradient, rate of water flow, heat radiation and heat loss. Sample calculations. Tables, diagrams, photographs. 14 ref. (T27, Cu)

319-T. (French, German.) **Structural Shapes in Building Construction.** *Pro-Metal,* v. 6, no. 33, June 1953, p. 185-190.

Manufacturing processes and varied applications for Cu alloys. Photographs. (T26, Cu)

320-T. (German.) **Replacement of Copper by Aluminum in High Current Bus Bars in Electrolytic Installations.** K. Kaizik. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 305-307.

New type of contacts. Economic advantages are claimed. Diagrams. 4 ref. (T1, Al, Cu)

321-T. (German.) **Aluminum Antimonide (Al Sb) as Rectifier Material.** G. Zielasek. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 308-309.

Significance of certain intermetallic compounds as rectifier materials. Diagrams, graph. 13 ref. (T1, Al, Sb)

322-T. (German.) **Heat Protection by Aluminum Foil.** W. Linicus. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 320-323.

Heat-resistant clothing and equipment made of Al foil and fabrics. Photographs, table. (T10, Al)

323-T. (German.) **Copper-Plated Aluminum in Electrical Engineering.** *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 323-324.

Uses of "Cupal" in electrical engineering field. Photograph, graph. 3 ref. (T1, Al, Cu)

324-T. (German.) **Use of "Reflectal" in Construction of Reflectors.** R. Lattey. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 582-586.

Reports preference of low Mg content and extreme hardness. Tests covered variables such as "Eloxal" coatings, purity of Al and type of reflection sought. Photographs, graphs, tables. 5 ref. (T10, P17, Al)

325-T. (German.) **Metallographic Problems in Industrial Working of Gold.** Otto Loebich. *Zeitschrift für Metallkunde,* v. 44, no. 7, July 1953, p. 286-292.

Treatment of Au alloys for jewelry, dental, and other purposes. Pointers for minimizing damage. Photographs. 9 ref. (T9, T10, Au)

326-T. (German, French.) **Valuable Light-Metal Parts From Hot Pressed Aluminum Alloys.** R. Muller. *Aluminium Suisse,* v. 3, no. 3, May 1953, p. 83-89.

Advantages, qualities, uses, construction and structure. Tables, diagrams, photographs. (T general, Al)

327-T. (German, French.) **Light-Metal Use in the Refrigerator Industry.** E. Baumli. *Aluminium Suisse,* v. 3, no. 3, May 1953, p. 90-92.

Advantages of "Peraluman" alloys. Corrosion data. Tables, photographs. (T27, R general, Al)

328-T. (Book-German.) **(Materials for Journal Bearings.) Werkstoffe für Gleitlager.** R. Kühnel, editor. Rev. ed. 2. 454 p. 1952. Springer-Verlag, Berlin, Germany.

Composition and properties of various bearing alloys and nonmetallic bearing materials. (T7, Pb, Sn, Cd, Al, Mg, Ag, Zn, Cu)

329-T. Some Properties of Copper and Its Alloys Used in the Chemical Industries. David D. Stead. *Australasian Engineer,* 1953, Feb. p. 50-56.

Graphs, tables. 12 ref. (T29, P general, Q general, Cu)

330-T. Aluminum Progress That Brings New Products. *Dun's Review and Modern Industry,* v. 62, Aug. 1953, p. 51-57.

Photographic review of this industry that now produces over 100,000 tons per month. (T general Al)

331-T. An Aluminium Alloy Bascule Bridge. *Engineer,* v. 196, Oct. 2, 1953, p. 429-431.

Movable spans of Al alloy. Novel methods of fabrication, operation and counterbalancing. Photograph, diagrams, tables. (T26, Al)

332-T. Choosing the Right Copper-Base Alloy. Harold J. Roast. *Foundry,* v. 81, Oct. 1953, p. 114-115.

Recommendations on different types of alloys for various applications depending on qualities desired in castings. Photograph. (T general, E general, Cu)

333-T. Which New Material Shall I Use? A Summary of Recent Developments. I. Julius J. Harwood. *Machine and Tool Blue Book,* v. 49, Oct. 1953, p. 208-210, 212, 214-216, 218-220, 222, 224-232.

Properties and possible uses of Ti, Al steels and reinforced plastics for rockets, missiles and atomic reactors. (To be continued.) (T2, T25, Ti, Al, ST)

334-T. Designing Springs. II. Stanley L. Albright. *Machine Design,* v. 25, Oct. 1953, p. 222-226.

How to achieve simplification and reduce costs. Diagrams. (T7)

335-T. Stainless Tubing in Radar Screens. *Materials & Methods,* v. 38, Oct. 1953, p. 116-118.

New fabricating procedure in step-by-step illustrations. Photographs. (T1, SS)

336-T. Wear Resistant Metal. E. L. Schaper. *Materials & Methods,* v. 38, Oct. 1953, p. 120-123.

Successful use of Mg alloys in bearings, shafts and gears. Photographs, tables. (T7, Mg)

337-T. Where Aluminum Die Castings Are Used to Withstand High Stress. George W. Coleman. *Precision Metal Molding,* v. 11, Oct. 1953, p. 61, 123-124.

Applications and advantages. Photographs. (T general, Q general, Al)

338-T. Ductile Iron Makes Good. *SAE Journal,* v. 61, Oct. 1953, p. 45-48.

Based on "Nodular Iron in Tractor Motors", H. L. Day; "Irons With Spheroidal Graphite", R. W. Mason, Jr.; and "Ductile Iron as an Engineering Material", B. L. Stott; presented at SAE Annual Meeting, Detroit, Jan. 13, 1953. Applications of spheroidal-graphite cast iron. Photographs. (T general, CI)

339-T. The Use of Multilayer High Reflecting Films for Reflection Multiple-Beam Interferometry. S. Tolansky. *Vacuum,* v. 2, July 1952, p. 231-244.

Photographs. 9 ref. (S11)

340-T. The Sheathing of Cables With Aluminum. Kenneth S. Wyatt. *Wire and Wire Products,* v. 28, Oct. 1953, p. 1062-1068.

New process and applications. (T7, Al)

341-T. Farm Equipment Steels. *Agricultural Engineering,* v. 34, Oct. 1953, p. 695-701.

Consists of "A Harvesting Machinery Engineer's Viewpoint", C. J. Scranton; "A Tillage Implement Metallurgist's Viewpoint", W. C. Bliesener; "A Tractor Engineer's Viewpoint", W. H. Nordenson; "A Steel Producer's Viewpoint", H. W. Browall. (T3, ST)

342-T. Aluminum Ceiling Panels for Heating and Cooling. E. S. Howarth, S. C. Huddleston, and R. M. Kock. *American Society of Heating and Ventilating Engineers, Transactions,* v. 57, 1951, p. 343-360; disc., p. 360-362.

Tests. Photographs, tables, graphs. (T27, Al)

343-T. An Investigation of Cemented Tungsten Carbide as Bearing Material. J. S. Kozacks, H. A. Erickson, H. W. Highriter, and A. R. Gabriel. *ASME, Transactions,* v. 75, Oct. 1953, p. 1203-1209.

Performance of bearings with different lubricating oils under varying load conditions. (T7, H general, C-n)

344-T. Increasing Use of Die Casting for Automotive Components. Thomas MacNew. *Automotive Industries,* v. 109, Oct. 15, 1953, p. 38-41, 98, 101.

New applications and their advantages. Photographs. (T21, E13, Al, Mg)

345-T. Aluminum - Alloy Bascule Bridge at Aberdeen. *Engineering,* v. 176, Oct. 16, 1953, p. 481-483.

"Double - leaf trunnion - mounted type" Photographs, plans. (T26, Al)

346-T. Design for a Modern Instrument Shop. G. L. Slocum. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 28-29.

Importance of instruments in modern refineries. Progress, modern designs, practices and operating methods are discussed. Photograph. (T8)

347-T. Experience With Aluminum Tubing for Instrument Air Connections. D. W. Humphrey. *Instrument Society of America, Proceedings,* v. 7, 1952, p. 73-75.

Availability, installation practices, users, and cost of Al tubing for instrument air connections. Photographs. (T8, Al)

348-T. Unique Steel Selection Method Reduces Die Costs. *Machinery,* v. 60, Oct. 1953, p. 188-191.

Use of matched toolsteels for better production. Photographs. (T5, T6, TS)

349-T. Making Hollow Steel Propeller Blades. *Machinery (London),* v. 83, Oct. 16, 1953, p. 757-766.

Step-by-step manufacture by de Havilland Propellers, Ltd. Photographs, diagrams. (T24, ST)

350-T. Aluminum Sheet Metal Practice in the Building Industry. *Modern Metals,* v. 9, Oct. 1953, p. 62, 64, 66, 68.

Cornices, gutters, downspouts, ductwork, flues and chimneys. Photographs, tables, diagrams. (T26, Al)

351-T. When Can You Use Cast Iron in the Refinery? W. J. Buxton. *Oil and Gas Journal,* v. 52, Oct. 19, 1953, p. 128-130, 132.

Uses and limitations of cast iron in petroleum refining equipment. Photographs. (T28, CI)

352-T. More Strength Less Weight. *Steel,* v. 133, Oct. 12, 1953, p. 130-134.

Applications of low alloy steels. Photographs. (T general, ST)

353-T. Hardenability. *Steel,* v. 133, Oct. 12, 1953, p. 138-139.

Uses and limitations of boron steels. Photographs. (T general, J26, AY)

354-T. Stainless Steels. *Steel,* v. 133, Oct. 12, 1953, p. 146-148, 150.

Applications and properties of various stainless steels. Photographs. (T general, Q general, SS)

355-T. Light Metals. Aluminum, Magnesium, Titanium. *Steel,* v. 133, Oct. 12, 1953, p. 163, 166, 168, 170.

Applications and mechanical properties of Al, Mg and Ti. Photographs, tables. (T general, Q general, Al, Mg, Ti)

356-T. Heat and Corrosion Resistant Materials. *Steel,* v. 133, Oct. 12, 1953, p. 173, 176, 179.

Choice of proper material for extreme service conditions. Photographs, tables.
(T general, Q general, SG-g)

357-T. (French.) **Frames of Prestressed Steel.** G. Magnel. *Ossature metallique,* v. 18e, no. 10, Oct., 1953, p. 507-519.

Calculations and applications in a hangar at Melbroeck, Belgium. Diagrams, photographs. (T26, ST)

358-T. Cast Iron Brake Drums. E. C. Toghill and H. T. Angus. *Automobile Engineer,* v. 43, Oct. 1953, p. 409-418.

Developments in design and materials to cope with problems of heat dissipation and drum distortion. Photographs, diagrams.
(T21, CI)

359-T. High Alloy Castings Resist High Temperatures. *Iron and Steel Engineer,* v. 30, Oct. 1953, p. 130, 134, 138.

Types employed and their applications in industry. Performances of each. Photographs.
(T general, Q general, AY, SS)

360-T. Light Alloy Sole Plates for Flat-Irons. *Light Metals,* v. 16, Oct. 1953, p. 330-331.

Types of aluminum alloys and characteristics of each. Photograph, table. (T10, Al)

361-T. Whirling Its Way Into New Fields. *Steel Horizons,* v. 15, Fourth Quarter, 1953, p. 10-13.

Use of gas turbine in industry today and future applications. Photographs. (T25)

362-T. Fine Tungsten and Molybdenum Wire for Electron Tubes. I. C. C. Gee. *Wire Industry,* v. 20, Oct. 1953, p. 977-978, 980-981.

General survey of properties and applications of fine tungsten and molybdenum wire as applied to electron tube manufacture. Photographs, tables. 3 ref. (To be continued.) (T1, W, Mo)

363-T. India's Gold and Silver Thread Industry. *Wire Industry,* v. 20, Oct. 1953, p. 993, 995, 997.

Equipment and processing techniques. Photographs. (T29, Ag, Au)

364-T. (Pamphlet.) **Utilization of Manganese, Nickel, Cobalt, Tungsten, Molybdenum.** Kenneth H. J. Clark, Chairman. 94 p. 1951. International Materials Conference, Washington, D. C.

Examines all practicable measures of effecting the highest degree of economy in the use of Mn, Ni, Co, W, and Mo. Includes methods which could be adopted by industry for the economical and efficient utilization of these metals and their alloys. Use of substitutes and waste products are given special consideration. (T general, A8, Mn, Ni, Co, W, Mo)

365-T. (Book.) **Aluminium and Its Alloys in Building.** 76 p. 1953. Aluminium Development Assoc., 33 Grosvenor St., London W. 1, England. 3s.6d.

Briefly describes characteristics of Al in relation to building. Uses of Al in industrial buildings, universities and schools, farm and horticultural buildings, lamp posts, and churches. (T26, Al)

366-T. (Book.) **Copper in Instrumentation.** 152 p. Copper Development Association, Kendalls Hall, Radlett, Herts. England. No charge.

Uses of Cu and its alloys in measuring and control instruments.
(T8, Cu)

367-T. (Book.) **Modern Uses of Nonferrous Metals.** C. H. Mathewson, editor. 2nd ed. 530 p. 1953. American Institute of Mining and Metallurgical Engineers, 29 W. 39th St., New York 18, N. Y. $7.00. ($4.90 to AIME members.)

Properties and behavior of metals commonly used as alloys. Completely rewritten. (T general, P general, Q general, EG-a)

SECTION V

MATERIALS—

General Coverage of Specific Materials

1-V. Thallium. L. Sanderson. *Canadian Mining Journal,* v. 73, Nov. 1952, p. 72-73.

Properties, natural occurrences, extraction, minerals and compounds, applications, and toxicity. (Ta)

2-V. The Metallurgy of Uranium. E. W. Colbeck. *Metal Industry,* v. 81, Nov. 7, 1952, p. 361-363; Nov. 14, 1952, p. 387-389.

Occurrence in economic deposits and methods used for preparation of the metal. Reviews physical, chemical, and mechanical properties. Tables and photographs. 30 ref.(U)

3-V. Germanium: a New "Gold Rush" in Coal. *Bituminous Coal Research,* v. 12, July-Oct., 1952, p. 10-11, 18.

Electrical properties, origin and study, use in electronic equipment, occurrence in coal, and future prospects. (B18, P15, T1, Ge)

4-V. Hafnium Metal—Its Properties and Future. John L. Everhart. *Materials & Methods,* v. 36, Nov. 1952, p. 95-97.

Mechanical, physical, and corrosion properties of ductile Hf which is just emerging from the laboratory curiosity stage. Forming characteristics, heat treatment, cleaning and finishing, joining, and applications. Tables and illustrations. (Hf)

5-V. Lead-Base Babbitts. *Materials & Methods,* v. 36, Nov. 1952, p. 145, 147.

Data sheet giving compositions, physical, mechanical, and fabrication properties, corrosion resistance, available forms and uses where anti-seizing characteristics, deformability, and corrosion resistance are required. (Pb, SG-c)

6-V. Iron Atoms in the Service of the Electrical Engineer. Charles Goodeve. *Proceedings of the Institution of Electrical Engineers,* v. 99, pt. 1, Nov. 1952, p. 225-232.

The 43rd Kelvin Lecture. The Fe atom, its chemical properties, physical strength, high - temperature steels, and magnetic properties. Micrographs and diagrams. (P15, T1)

7-V. A Realistic Look at Titanium. R. W. Parcel. *SAE Journal,* v. 60, Dec. 1952, p. 29-32. (Based on "The New Metal, Titanium: Its Application and Processing", R. W. Parcel.)

Limitations as well as advantages, taking into account physical properties, machinability and fabrication of the metal.
(P general, Q general, G17, Ti)

8-V. The Commercial Development of Three German Wrought Zinc Alloys. Jacob Schramm. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 436-456.

Three Zn-base alloys designed to save Al and Cu are described. Difficulties encountered in casting, extrusion, drawing and straightening, and counter measures needed to overcome these troubles. (Zn)

9-V. Japanese Substitution Steels in the Last War. Seiji Nishikiori. *American Society for Metals,* "Proceedings of the First World Metallurgical Congress", 1952, p. 483-489.

Compositions and properties. Tables and diagrams. (ST)

10-V. Germanium and Its Inorganic Compounds. Otto H. Johnson. *Chemical Reviews,* v. 51, Dec. 1952, p. 431-469.

Occurrence, physical and electrical properties, halogen compounds, oxides and hydroxides, sulfides and nitrides of Ge, germanides and alloys, inorganic acids of Ge, germanates, and physiological properties of Ge compounds. Tables. 213 ref. (Ge)

11-V. End of the Trail: Zirconium. *Chemical Week,* v. 72, Jan. 10, 1953, p. 32, 34, 36.

Occurrence, physical properties, beneficiation, and cost. (Zr)

12-V. High Temperature Metals Part II. (Concluded.) Albert E. White *Industrial Heating,* v. 19, Dec. 1952, p. 2282, 2284, 2286, 2288, 2290.

Applications, properties and compositions of superalloys. Possible uses in automotive field. Graphs. (Q general, T21, Sg-h)

13-V. Aluminum Bronze. John L. Everhart. *Materials & Methods,* v. 36, Dec. 1952, p. 119-134.

Classification, engineering properties, processing and fabrication, joining practice, heat treatment, surface finishing, applications. (Cu)

14-V. Titanium, Metal of the Jet Age. John Loughlin. *Metal Age,* Dec. 1952, p. 10-11, 14.

Physical properties and economic status. (Ti)

15-V. (French.) **Industrial Aluminum Alloys.** Jean Herenguel. *Revue de Metallurgie,* v. 49, Nov. 1952, p. 765-776.

Reviews reasons for creation of various alloys, mechanical properties, corrosion resistance, welding, and uses. Probable improvements. Tables, charts, and photographs. 14 ref. (Q general, R general, K general, T general, Al)

16-V. Lithium Today and Tomorrow. H. C. Meyer, Jr., and J. Fentress. *Institute Spokesman,* v. 16, Jan. 1953, p. 8-10, 13-14, 16.

How Li is produced from the mine to finished product. Ores, chemical processing, commercial demand. (Li)

17-V. Properties and Applications of High Purity Iodide Ductile Zirconium. W. M. Raynor. *Foote Prints,* v. 24, no. 2, 1952, p. 25-35.

Mechanical and physical properties, gas gettering properties, applications, and corrosion resistance. Graphs and Photographs. (P general, Q general, T general, R general, Zr)

18-V. Zirconium. Another Wonder Metal. Clyde Williams. *Monthly Business Review,* v. 35, Jan. 1, 1953, p. 15.

Occurrence, properties, uses, and future prospects. (Zr)

19-V. (French.) **Refractory Steels.** L. Guitton. *Flamme et Thermique,* v. 6, Oct. 1952, p. 30-36.

Review based on work done at Acieries Electrique d'Ugine, France. Problem of corrosion at high temperatures, principal types of refractory steels, their behavior at low and high temperatures, heat treatment, welding and machining. Tables and graphs.
(R2, K general, J general, G17, SS)

20-V. (Book.) **Titanium Bibliography. 1900-1951.** 197 pages. 1952. Battelle Memorial Institute, Columbus 1, Ohio.

Sections on raw materials and ore preparation; chemistry of Ti; chemical analysis for Ti; extraction, reduction, and refining; foundry; mechanical working; powder metallurgy; heat treatment; joining; cleaning, coating, and finishing; constitution and primary structure; transformations and resulting structure; physical, mechanical and surface properties; alloys of Ti; and applications of Ti and its compounds. (Ti)

21-V. The Economic Importance of the Rare Earths. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 25, Jan. 3, 1953, p. 91, 93-94.

Value of adding rare earths, Ce, La, Nd, Er, Yb, Pr, Pm, Sm, Eu, Tm, Lu, Gd, Tb, Dy, and Ho, to cast iron, alloy steels, stainless steel, tool steels, Si steels, and heat resisting steels. Superior mechanical properties, better resistance to corrosion, easier cogging and forging, and higher electrical properties.
(R general, Q general, P15, F22, AY, EG-g)

22-V. Materials Data Sheet. Low Expansion Nickel Alloys. *Materials & Methods,* v. 37, Jan. 1953, p. 123.

Tabulated information on physical and mechanical properties, thermal treatment, fabricating properties, corrosion resistance, and available forms.
(P general, Q general, J general, G general, R general, SG-s)

23-V. Perunal, A High-Strength Aluminum Alloy of the Al-Zn-Mg-Cu Type. H. Hug. *Aluminium Suisse,* v. 2, Nov. 1952, p. 203-209.

Reports on a Swiss alloy, containing 90% Al, 6% Zn, 2% Mg, 1.5% Cu, 0.3% Mn, and 0.2% Cr. Structure, heat treatment, properties, and applications are diagrammed and illustrated.
(M27, J general, Q general, T general, Al)

24-V. (English.) **Types of Stainless Steel Produced in Sweden.** Gunnar Lindh and Helmer Nathorst. *Jernkotorets Annaler,* v. 136, No. 10, 1952, p. 413-428.

Properties and uses of Swedish stainless steels. Data are tabulated.
(Q general, T general, SS)

25-V. (Norwegian.) **Boron in Special Steels.** *Teknisk Ukeblad,* v. 99, Nov. 6, 1952, p. 844-846.

Sources, properties, and uses of boron and the development, production, forging, heat treatment, and uses of boron steel. Graphs.
(D general, F22, J general, T general, AY)

26-V. NAA Reveals Titanium Experience. *Aviation Week,* v. 58, Feb. 2, 1953, p. 21-22, 25, 27-28.

Work to date indicates that stretching processes are better for this metal than impact methods. Includes discussion of properties and welding of titanium. Photographs and diagram.
(G general, Q general, K general, Ti)

27-V. Search for High-Temperature Materials. William L. Bruckart. *Battelle Technical Review,* v. 2, Feb. 1953, p. 19-20.

Use of ceramics, promise of Mo, Mo alloys and other metals, and problem of joining.
(SG-h, Mo, AY)

28-V. Titanium Evaluated for Ordnance. Benjamin S. Mesick. *Journal of Metals,* v. 5, sec. 1, Feb. 1953, p. 136-137.

Occurrence, reduction, physical properties, mechanical properties, weldability, and fabrication of Ti. (T2, Ti)

29-V. Developments in Alloy Steels: A Review of Recent Progress. C. Sykes. *Metallurgia,* v. 47, Jan. 1953, p. 3-8.

Places main emphasis on field of corrosion and heat resisting steels. Reference to high speed steels, boron steels, and use of rare earths as alloying elements. Also Cb steels, corrosion resistance, and intergranular corrosion of stainless steels, Tables, diagrams, photographs. 30 ref. (R general, AY, SS, SG-h)

30-V. Copper and Copper Alloys: A Survey of Technical Progress During 1952. E. Voce. *Metallurgia,* v. 47, Jan. 1953, p. 9-17.

Production, foundry practice, fabrication, finishing and plating, properties and applications, corrosion and protection, joining, physical metallurgy, powder metallurgy, analysis, and testing. 205 ref. (Cu)

31-V. A Sterling Silver Containing Aluminium. G. E. Gardam. *Metallurgia,* v. 47, Jan. 1953, p. 29-33.

Addition of small amounts of Al to sterling silver to prevent "fire-stain" defects and enhance hardness. Constitution of the alloys, precipitation hardening, properties. Diagrams, microphotographs, and photographs. 6 ref. (Ag)

32-V. Developing Nimonic Alloys. *Aeroplane,* v. 84, Jan. 23, 1953, p. 122-124.

Methods of research, testing, and production of various alloys. Photographs. (Ni)

33-V. Gold. In Fact, Fiction, and Finance. Carle R. Hayward. *Technology Review,* v. 55, Feb. 1953, p. 207-210, 216, 218, 220.

Considers Au from original discovery to present times. (Au)

34-V. (Book.) **Refractory Hard Metals.** Paul Schwarzkopf and Richard Kieffer. 400 pages. 1952. Macmillan Co., 60 Fifth Ave., New York 11, N. Y. $7.50.

Covers the high-melting carbides, borides, nitrides, and silicides, which are expected to play a predominant part in future metallurgical developments. Methods of preparation and properties of these substances as well as their applications in high-temperature materials. Includes for comparison, recent high-temperature developments in superalloys and ceramics. (EG-d, SG-h)

35-V. New Magnesium-Zirconium Casting Alloy. R. J. M. Payne, A. D. Michael, and R. W. Eade. *Magnesium Review and Abstracts,* v. 8, Dec. 1952, p. 173-176.

How Mg-Zn-rare earth-Zr casting alloy was evolved to meet special requirements. Graphs. (Mg)

36-V. Zirconium As a Coming Metal. *Mining Journal,* v. 240, Feb. 6, 1953, p. 157-159.

Properties, applications, production, and refining problems. (Zr)

37-V. Tonnage Titanium Production. C. I. Bradford and W. L. Finlay. *Modern Metals,* v. 9, Feb. 1953, p. 68-71.

Reasons for growth of production and progress in technological matters. Graphs and photographs. (Ti)

38-V. New Austenitic Stainless. Good Alternate for 18-8. R. L. Hatschek. *Iron Age,* v. 171, Mar. 12, 1953, p. 135-138.

Alloy using Mn in place of Ni compares with 18-8 in respect to corrosion, fabrication, and fatigue properties. Tables and photographs.
(R general, Q7, SS)

39-V. Aluminium and Its Alloys in 1952. E. Elliott. *Metallurgia,* v. 47, Feb. 1953, p. 73-80.

General review of the research and technical progress in various aspects of Al metallurgy. 96 ref. (Al)

40-V. An Appraisal of Silicon and Its Alloys. William R. Johnson and Max Hansen. *Metal Progress,* v. 63, Feb. 1953, p. 105-109.

Describes production, properties, and principal uses. Graphs and micrographs. (Si)

41-V. Engineering Data on Wrought 35 Ni-15 Cr Alloy. Paul Goetcheus. *Industrial Heating,* v. 20, Mar. 1953, p. 454-456, 458, 460, 462, 464.

Chemical composition, physical properties, mechanical properties, heat treatment, welding, cutting, machining, forming, forging, and uses. Tables and photographs. (SS)

42-V. Russians Show Progress on Stainless and Heat-Resisting Steels.

Carl A. Zapffe. *Iron Age,* v. 171, Mar. 19, 1953, p. 138-142.

Use of W, Si, and Ni in Russian stainless steel technology. Compositions of various steels. Tables. 11 ref. (SS)

43-V. Gallium. L. Sanderson. *Canadian Mining Journal,* v. 74, Mar. 1953, p. 81-82.

History, distribution, properties, recovery, and industrial uses. (Ga)

44-V. Malleable Iron Castings. H. R. Clauser. *Materials & Methods,* v. 37, Mar. 1953, p. 109-124.

Properties, characteristics, and uses of the various types of malleable castings. Tables and photographs. (CI)

45-V. Tin and Tin Alloys. *Materials & Methods,* v. 37, Mar. 1953, p. 127.

Tabulated information includes composition; physical and mechanical properties; corrosion resistance; and various uses.
(Q general, P general, R general, Sn)

46-V. Tin-Base Bearing Metals. *Materials & Methods,* v. 37, Mar. 1953, p. 129.

Tabulated information includes composition; physical and mechanical properties; corrosion resistance; and uses. (Q general, P general, R general, SG-c; Sn)

47-V. (Dutch.) **Copper and Copper Alloys. Pt. 10. Beryllium-Copper.** W. G. R. DeJager. *Metalen,* v. 7, Dec. 15, 1952, p. 427-431; v. 8, Jan. 15, 1953, p. 9-11.

Tabulates, diagrams, and discusses the standard compositions of commercially available alloys as well as their mechanical, physical, electric, and thermal properties.
(P general, Q general, Cu)

48-V. (German.) **The Wrought Zinc Alloy $ZnAl_4Fe$.** J. Schramm. *Metall,* v. 7, Feb. 1953, p. 93-102.

Ingot preparation, working process, properties, influence of chemical composition, and applications. Tables, photographs, diagrams, and charts. (Zn)

49-V. (German.) **Standardization and Present-Day Lead Research.** W. Hofmann. *Metall,* v. 7, Feb. 1953, p. 109-110. (S22, Pb)

50-V. (Book.) **Stainless Steel Handbook.** 120 pages. 1951. Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa.

Discusses selection of the proper type of stainless, tabulates properties of the more important analyses, and lists resistances of major types to many corrosive media. Each grade is presented by itself, with its analysis, applications, and treatments. Includes stabilized types and those designed for high and low-temperature applications. (SS)

51-V. New High-Temperature Materials. Paul Schwarzkopf. *American Machinist,* v. 97, Apr. 13, 1953, p. 147-150.

Use of TiC and borides of Mo in product design; forming and machining; and production planning. (H general, T general, Ti, Mo)

52-V. Titanium—a Survey. P. L. Teed. *Engineering,* v. 175, Feb. 20, 1953, p. 251-252; Mar. 13, 1953, p. 341-342; Mar. 27, 1953, p. 413.

Properties, applications, production, and forging of Ti. Part 2: Alloys with metals, gaseous elements, and nonmetallic solids. Economic data for available alloys. Part 3: Additional properties. Tables and diagrams. (Ti)

53-V. Permanent Magnets Attract More Industry Attention. Ernest E. George. *Steel,* v. 132, Apr. 20, 1953, p. 110-113.

Shows that strategic Ni and Co hinder production. Compares casting and sintering processes and their uses. Improved magnetic materials and powder metallurgy techniques have removed size and shape barriers. Photographs.
(E general, H general, SG-n, p) .

54-V. Precipitation Hardening Stainless Steels. James Joseph. *Aero Digest,* v. 66, Apr. 1953, p. 52, 54, 56, 58.

Properties and advantages. Photographs. (Q general, SS)

55-V. Alloy Steels for Special Purposes. J. Lomas. *British Steelmaker,* v. 19, Apr. 1953, p. 182-185.

Some toolsteels are described with recommended data for forging, heat treatment, and inspection.
(F22, J general, S general, TS)

56-V. (Pamphlet.) **Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar.** Office of Technical Services, U. S. Department of Commerce, PB 111083, 95 pages.

Includes "History of Titanium"; "Present Production Status of Titanium"; "Production, Properties and Uses of High Purity Titanium"; "Physical and Mechanical Properties of Commercial Titanium and Its Alloys"; "Corrosion Resistance of Titanium and Its Alloys'; "Casting and Forging of Titanium and Its Alloys"; and "Applications and Potential Uses for Titanium and Its Alloys". (Ti)

57-V. Low-Zinc Brasses. *Copper & Brass Bulletin,* no. 164, May 1953, p. 8-9.

Properties and uses of various brasses. (Q general, T general, Cu)

58-V. Carboloy Cemented Carbide. Hardest Man-Made Metal. Kenneth R. Beardslee. *General Electric Review,* v. 56, May 1953, p. 51-55.

Problems, progress, applications, future uses. Photographs. (W, C-n)

59-V. Corrosion-Resistant Alloy Combines Heat and Corrosion Resistance With Workability. *Machine Design,* v. 25, May 1953, p. 151-152.

Describes Hastelloy F, which was developed as an intermediate in corrosion resistance, workability, and cost between austenitic stainless steels and Ni-Mo alloys. (R general, Q23, Ni, SG-g, h)

60-V. A New Corrosion Resistant Alloy. Its Properties and Possible Uses. *Materials and Methods,* v. 37, May 1953, p. 92-93.

Corrosion resistance, fabrication, and applications of Hastelloy F. (R general, T general, Ni)

61-V. The Story of Nickel Since 1939. W. G. Wright. *Australasian Engineer,* Mar. 1953, p. 42-50.

An account of the International Nickel Co.'s activities since 1939. General information on known important world sources of Ni, and some description of new mining constructions by Inco. Postwar developments in relation to Ni, including Nimonic alloys, alloy cast irons, improved Ni-Fe magnetic alloys, Ni in powder metallurgy, and spheroidal graphite cast iron. Brief notes on the extraction of the precious metals from electrolytic sludges. Photographs. (Ni)

62-V. The Investigation of Titanium Alloy Systems. G. L. Miller. *Industrial Chemist,* v. 29, May 1953, p. 207-213.

Comprehensive review of U. S. developments in the study of Ti. Graphs, micrographs. 12 ref. (Ti)

63-V. (French and German.) Raffinal —Its Preparation and Application. H. Bettler. *Aluminium Suisse,* v. 3, no. 2, Mar. 1953, p. 51-54.

"Raffinal" (trade-marked name for purest Al) is discussed in terms of its preparation, chemical and physical properties, and uses. (Al)

64-V. Germanium. L. Sanderson. *Canadian Mining Journal,* v. 74, May 1953, p. 81-82.

Occurrence, extraction, physical properties, recovery from flue dusts, reduction with C and use in electronics. (Ge)

65-V. Precipitation Hardening Stainless Steels. M. E. Carruthers. *Electrical Manufacturing,* v. 51, June 1953, p. 132-136.

Investigations using ferritic Cr stainless steels containing Cu; 18 to 65% Cr, 2 to 35% Ni steels; 18% Cr, 8% Ni steels modified with Ti, Be, B, or P; and Cr-Ni steels that were marginal as to whether their microstructures were austenitic or martensitic. Study included compositions, and mechanical, high-temperature, physical, and welding properties. Tables. (M27, N7, Q general, P general, K general, SS)

66-V. New High Purity Aluminum Alloys. *Materials & Methods,* v. 37, June 1953, p. 110-111.

Properties, fabrication, and applications of "Lurium". Table, photographs. (Al)

67-V. Titanium, Molybdenum, Zirconium, and Hafnium. *Materials & Methods,* v. 37, June 1953, p. 125.

Data sheet gives physical, mechanical, and fabricating properties; thermal treatment, corrosion resistance, available forms, and uses. Table. (Ti, Mo, Zr, Hf)

68-V. Tungsten, Tantalum, Columbium, and Vanadium. *Materials & Methods,* v. 37, June 1953, p. 127.

Data sheet gives physical, mechanical, and fabricating properties; thermal treatment, corrosion resistance, available forms, and uses. Table. (W, Ta, Cb, V)

69-V. Titanium. The New Light Metal. Rolt Hammond. *Machinery Lloyd* (Overseas Ed.), v. 25, May 23, 1953, p. 69, 71, 73-78.

Occurrence, history of development, structure, properties, and application. (Ti)

70-V. The Metallurgy of Zirconium. E. T. Hayes and W. W. Stephens. *Metal Progress,* v. 63, May 1953, p. 97-110.

General description of the production, properties, and uses of Zr. Tables, photographs. (Zr)

71-V. 17% Chromium Stainless Steel. *Machine Design,* v. 25, June 1953, p. 118-122.

Shows that the above is an effective replacement for Ni-bearing stainless steel. Corrosion resistance, mechanical properties, performance at low and high temperatures, magnetic properties, weldability, weld design, brazing, soldering, stamping, drawing, forming, spinning, machin-

ing, and surface finish. Photographs, tables. (SS)

72-V. The Cast Iron That Bends. Richard Sneddon. *Petroleum Engineer*, v. 25, June 1953, p. E5-E6.

Structure, mechanical and physical properties, and uses of ductile cast iron in petroleum industry. (T29, M27, Q general, P general, CI)

73-V. Titanium—Today and Tomorrow. I. Today. II. Tomorrow. *SAE Journal*, v. 61, May 1953, p. 20-24; June 1953, p. 56-65.

Information from "The Bases for Tonnage Titanium Production", C. I. Bradford; "Titanium Alloys for Aircraft Engine Forgings", L. R. Frazier; "Titanium Alloy Development," M. Hansen and H. D. Kessler; "Titanium in Airframes", F. R. Kostock; and "Utilization of Titanium and Other Alloys in Corrosive Environments", W. L. Williams. Photographs, diagrams. (C general, F general, T24, R general, Ti)

74-V. Hastelloy Alloy F. A New Corrosion-Resistant Alloy for Lined Digesters. Merril A. Scheil. *Tappi*, v. 36, June 1953, p. 241-247.

Corrosion resistance; mechanical and physical properties; applications; welding characteristics; and fabrication experience. Photographs. (Ni)

75-V. Production Properties and Uses of High Purity Titanium. E. A. Anderson. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 17-32; P. B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

A progress report presenting data on physical and mechanical properties of Ti. Graphs, tables, photographs. 14 ref. (C general, P general, Q general, T general, Ti)

76-V. Physical and Mechanical Properties of Commercial Titanium and Its Alloys. W. L. Finlay. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 33-54; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Development, properties, fabrication, and uses of Ti. Photographs, tables, graphs. (P general, Q general, T general, Ti)

77-V. Applications and Potential Uses for Titanium and Its Alloys. N. E. Promisel. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 83-91; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Outstanding general characteristics of Ti and Ti alloys. Table, photographs. (Ti)

78-V. (German.) **Tungsten—Its Properties, Use, and Production.** Richard Kerschagl. *Metall*, v. 7, nos. 9-10, May 1953, p. 373-376.

History, properties, ores, uses, occurrence, production, and prices. 27 ref. (W)

79-V. (Hungarian.) **Development of Titanium Metallurgy.** *Kohaszati Lapok (Aluminium)*, v. 4, no. 12, Dec. 1952, p. 276-285.

General review. Discusses Ti deposits; methods of Ti metallurgy; physical and mechanical properties of metallic Ti; and some technically important Ti alloys. Tables, charts, diagrams. (Ti)

80-V. (Book.) **Zirconium and Zirconium Alloys.** 354 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $7.00.

Consists of 21 papers presented at the Eighth Western Metal Congress and Exposition, Los Angeles, Mar. 23-27, 1953. Individual papers are abstracted separately. (Zr)

81-V. Nickel and Its Alloys. Fabrication Process Used. D. R. Stewart. *Australasian Engineer*, April 7, 1953, p. 66-71.

Heating; forging; annealing; age hardening; joining; arc, oxyacetylene, atomic hydrogen, and resistance welding; soldering; riveting; cold working methods; deep drawing; spinning; machining; precision grinding; shearing; pickling; and thermal cutting. (Ni)

82-V Nickel and Its Alloys. Properties of Materials. W. G. Wright. *Australasian Engineer*, April 7, 1953, p. 71-74.

Various Ni alloys for low and high-temperature applications. Tables. (P general, Ni)

83-V. New Stainless Alloy Fills Long Industry Need. N. F. Mott. *Iron Age*, v. 171, June 18, 1953, p. 149-153.

The new V2B is a hardenable 18-8 stainless alloy containing Cu, Mo, Si, and a small amount of Be. Corrosion resistance, handenability, and machinability. Tables, micrographs. (R general, J28, G17, SS)

84-V. Spheroidal Graphite Cast Iron. Potentialities for the Machine Tool and General Engineering Industries. A. B. Everest. *Machinery* (London), v. 82, June 19, 1953, p. 1166-1172.

Mechanical properties, production economy, machinability, wear resistance, heat treatable types, weldability, and applications. Photographs. (CI)

85-V. How Precious Are the Precious Metals? John M. West. *Metallurgia*, v. 47, June 1953, p. 288–290.

Origins and growth of the Au standard; properties of Au and Ag alloys; and a suggested Ti standard. (Au, Ag, Ti, EG-c)

86-V. Economic Utilization of Copper-Base Alloys. *Metal Industry*, v. 82, June 19, 1953, p. 499-501.

Economy in Cu-base alloys to the foundrymen and user. Properties obtainable in casting and choice of alloy for service. (Cu)

87-V. Thorium. L. Sanderson. *Canadian Mining Journal*, v. 74, July 1953, p. 68-69.

Distribution, properties, radioactivity, concentration, extraction, compounds, and industrial uses. (Th)

88-V. New Metals. Nathaniel Arbiter. *Engineering and Mining Journal*, v. 154, July 1953, p. 94-99.

Alkali metals, alkaline earths, trivalent elements and Group Four metals. General evaluation. (A general, EG-e, f)

89-V. Economic Utilization of Copper-Base Alloys. Report of Sub-Committee T.S. 38 of the I.B.F. Technical Council. F. C. Evans, chairman. *Foundry Trade Journal*, v. 95, July 9, 1953, p. 41-48.

Properties obtainable in Cu-base castings. Utilization, strength, and standardization. Tables. (Q general, T general, S22, Cu)

90-V. Selection of Engineering Materials. Non-Ferrous Metals. S. C. Churchill. *Machinery* (London), v. 83, July 3, 1953, p. 19-23.

Brasses, bronzes, Ni, Al, and Mg alloys. Effect of quantity on choice of production method. Photographs. (Cu, Ni, Al, Mg)

91-V. Manganese Steels. *Materials & Methods*, v. 38, July 1953, p. 105.

Tabulated data on composition, physical and mechanical properties, thermal treatment, fabricating properties, corrosion resistance, available forms, and uses. (AY)

92-V. (Dutch.) **Copper and Copper Alloys. X. Beryllium-Copper.** W. G. R. DeJager. *Metalen*, v. 8, no. 3, Feb. 15, 1953, p. 55-57; no. 5, Mar. 14, 1953, p. 101-102.

Corrosive, electrical, and mechanical properties of Be-Cu alloys. Tables, graphs. (R general, P15, Q general, Cu)

93-V. (Russian.) **Gallium.** G. Vagner and B. Gitzen. *Uspekhi Khimii*, v. 22, no. 1, Jan. 1953, p. 106-114.

Physical properties and possible uses of Ga. 39 ref. (P general, Q general, T general, Ga)

94-V. (Book.) **Boron Steel. 2nd Rev. Ed.** Ernest E. Thum, editor. 111 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $1.00.

Consists of 17 articles most of which have previously appeared in *Metal Progress*. (AY)

95-V. Experts Learn to Live With Titanium. Irving Stone. *Aviation Week*, v. 59, Aug. 3, 1953, p. 30, 32-33, 36-37.

Use of Ti in jet engines; briefly describes alloys, forging, sheet fabrication, welding, machinability and heat treatment. Photographs, diagrams. (T25, Ti, Al)

96-V. Titanium. Its Physical Metallurgy and Potentialities. H. V. Kinsey. *Canadian Mining and Metallurgical Bulletin*, v. 46, July 1953, p. 411-420; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 56, 1953, p. 191-200.

Physical properties, sources, extraction, melting, power requirements, powder metallurgy, hot-working, commercial alloys and applications. Tables, graphs, micrographs. 45 ref. (Ti)

97-V. 17% Chromium Stainless Steels. *Chemical Engineering*, v. 60, Aug. 1953, p. 260, 262, 264, 266, 268.

Corrosion resistance, applications and physical and mechanical properties. Tables. (R general, P general, Q general, SS)

98-V. Production, Analysis, and Applications of the Lanthanons. R. C. Vickery. *Industrial Chemist*, v. 29, July 1953, p. 291-294.

Recent developments in general chemistry of rare earths. 35 ref. (EG-g)

99-V. The Manufacture and Properties of Titanium and Its Alloys. N. P Allen. *Metal Treatment and Drop Forging*, v. 20, June 1953, p. 245-252; July 1953, p. 327-334.

Early production; purity of commercial Ti; crystalline and general working properties; and common alloying elements. Production processes which control availability for commercial use. Graphs, micrographs, diagrams. 24 ref. (Ti)

100-V. Rare Earths Series. Their Atomic Structure, History and Uses.

M. C. Irani. *Mines Magazine,* v. 43, Apr. 1953, p. 29-34.

Atomic structure, history, and occurrence of rare earth metals. Preparation and uses of alloys and compounds. (EG-g)

101-V. Titanium. W. H. Dennis. *Mining Magazine,* v. 89, July 1953, p. 19-26.

Uses and present metallurgical position. Diagrams, table, photograph. (T general, Ti)

102-V. Germanium Is in Demand. J. L. P. Wyndham. *South African Mining and Engineering Journal,* v. 64, June 27, 1953, p. 687, 689, 691.

History, metallurgy, extraction and properties. Tables. 7 ref. (Ge)

103-V. Middleweight Champ Comes of Age. *Western Machinery and Steel World,* v. 44, July 1953, p. 102-103.

Developments which have extended use of Ti. Micrographs, photographs. (Ti)

104-V. Strategic Beryllium From Domestic Pegmatites. B. H. Clemmons and James S. Browning. *Mining Engineering,* v. 5, Aug. 1953, p. 786-788.

Occurrence, production, consumption, uses, processing and recovery of Be. Table, map.
(B10, C general, T general, Be)

105-V. (French.) **Specification for Production of A-U5 GT.** *Fonderie,* no. 89, June 1953, p. 3488-3491.

Chemical composition, mechanical characteristics, heat treatment, and casting characteristics of an Al-Cu alloy used for decorative applications. (S 22, Q general, J general, E general, Al, Cu)

106-V. (Hungarian.) **Metallurgical Problems of High-Quality Mild Steels.** Istvan Balsay. *Kohaszati Lapok,* v. 7, no. 11, Nov. 1952, p. 249-263.

Comprehensive review. Realm of application of these steels, qualitative requirements, and metallurgical prerequisites for these requirements. 19 ref. (T general, ST)

107-V. (Book.) **Symposium on Aluminum Alloy Castings.** 224 p. 1953. The Aluminium Development Association, 33 Grosvenor St., London W.1, England. 4s.

Presents papers on welding, finishing, and uses of Al alloy castings. (K general, L general, T general, Al)

108-V. Production and Utilisation of Titanium and Zirconium. H. W. Worner. *Australasian Engineer,* 1953, July, p. 46-50.

Extraction, melting, fabrication, properties and applications. Table, charts. 11 ref. (Ti, Zr)

109-V. The Properties and Applications of Corronel B. *Industrial Chemist and Chemical Manufacturer,* v. 29, Sept. 1953, p. 397-399.

Alloy composed of 66% Ni, 28% Mo and 6% Fe. Methods of working and uses. Tables. (Ni)

110-V. Selenium. A Scarce By-Product Metal. *Mining Journal,* v. 241, Aug. 28, 1953, p. 241-242.

Uses and recovery processes.
(T general, C general, Se)

111-V. (Portuguese.) **Boron Steels: Their Principal Metallurgical Characteristics and Industrial Applications.** Luiz C. Correa da Silva. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 109-140.

Production details, metallurgical characteristics, tempering and mechanical properties and industrial application. Tables, graphs. 8 ref. (Q general, J29, T general, B, AY)

112-V. Fabrication of Copper and Copper Alloys. Some Common Faults. David D. Stead. *Australasian Engineer,* 1953, Aug. 7, p. 48-53.

Manufacture of hot pressings, corrosion failures, fire cracking, annealing, embrittlement, welding, forming, drawing, machining, finishing, and design. Photographs, micrographs. (Cu)

113-V. Copper, Lead and Zinc. Their Future. Webster Hodge. *Battelle Technical Review,* v. 2, Oct. 1953, p. 111-112.

Applications and sources of Cu, Pb, and Zn. (Cu, Pb, Zn)

114-V. The Production and Properties of Tantalum and Zirconium. G. L. Miller. *Industrial Chemist and Chemical Manufacturer,* v. 29, Oct. 1953, p. 482-488.

Production of tantalum and zirconium and their application in the chemical industry with reference to corrosion resistance and mechanical properties.
(C general, R general, Q general, Zr, Ta)

115-V. (Hungarian.) **Some Hitherto Undiscussed Properties of the High-Strength Al-Mg-Si Alloy.** Andor Benko. *Aluminium (Budapest),* v. 5, no. 7, July 1953, p. 153-158.

Modifications caused by impurities encountered during the manufacturing process. Softening conditions, corrosion resistance, deep drawing capacity and adaptability to second rolling, fatigue limit, weldability and the probability of hitting the correct composition during production. Tables, graphs. (Al, Mg, Si)

116-V. Aluminum 218. *Alloy Digest,* no. Al-9, Oct. 1953.
Composition, physical constants, properties, machinability, castability, corrosion resistance and general characteristics of this die casting alloy. (Al)

117-V. Noral C77S. *Alloy Digest,* no. Al-10, Nov. 1953.
Composition, physical constants, properties, heat treatment, machinability, weldability, workability and general characteristics of a heat treatable, wrought aluminum alloy. (Al)

118-V. Corrosiron. *Alloy Digest,* no. CI-3, Oct. 1953.
Composition, physical constants, properties, machinability, weldability, corrosion resistance and general characteristics of a high-silicon cast iron. (CI)

119-V. ABK Metal. *Alloy Digest,* no. CI-4, Nov. 1953.
Composition, physical constants, properties, machinability, weldability, castability and general characteristics of an abrasion resistant alloy cast iron. (CI)

120-V. Conduloy. *Alloy Digest,* no. Cu-11, Oct. 1953.
Composition, physical constants, properties, heat treatment, castability, workability, machinability, weldability and general characteristics of a beryllium-copper casting alloy. (Cu)

121-V. Phosnic Bronze. *Alloy Digest,* no. Cu-12, Nov. 1953.
Composition, physical constants, properties, heat treatment, workability, machinability, weldability, corrosion resistance and general characteristics of a high strength and high-conductivity bronze. (Cu)

122-V. Kovar "A". *Alloy Digest,* no. Fe-3, Oct. 1953.
Composition, physical constants, properties, heat treatment, machinability, workability, weldability, pickling and general characteristics of a metal-to-glass sealing alloy. (Fe, Ni, Co)

123-V. Jalten. *Alloy Digest,* no. SA-12, Nov. 1953.
Composition, properties, machinability, workability, weldability, corrosion resistance and general characteristics of a low-alloy high-strength steel. (AY)

124-V. RA-330. *Alloy Digest,* no. SS-11, Oct. 1953.
Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics of a corrosion and heat resistant alloy steel. (SS, Ni, Cr)

125-V. "16-25-6" Alloy. *Alloy Digest,* no. SS-12, Nov. 1953.
Composition, physical constants, properties, heat treatment, machinability, weldability and general characteristics of a high-temperature alloy steel. (SS)

126-V. Carpenter R.D.S. *Alloy Digest,* no. TS-11, Oct. 1953.
Composition, properties, heat treatment, machinability, weldability, workability and general characteristics of this oil-tough toolsteel. (TS)

127-V. Cobaltcrom. *Alloy Digest,* no. TS-12, Nov. 1953.
Composition, physical constants, properties, heat treatment, workability, machinability, weldability and general characteristics of an air-hardening, non-deforming toolsteel. (TS)

128-V. Graph-M.N.S. *Alloy Digest,* no. TS-13, Nov. 1953.
Composition, properties, heat treatment, workability, grinding practices and general characteristics of a graphitic die steel. (TS)

129-V. (Dutch.) **Copper and Copper Alloys. XII. Chromium-Copper.** W. G. R. DeJager. *Metalen,* v. 8, no. 17, Sept. 15, 1953, p. 328-329.
Heat treatment, properties and uses of chromium-copper alloys. Graphs. (J general, Q general, P general, T general, Cu, Cr)

ADDRESSES OF PUBLICATIONS

I. ENGLISH LANGUAGE JOURNALS

A

ACI Proceedings, American Concrete Institute, 18263 W. McNichols Rd., Detroit 19, Mich.

Acta Metallurgica, 57 East 55th St., New York 22, N. Y.

Advances in Physics, Taylor & Francis, Ltd., Red Lion Court, Fleet St., London E. C. 4, England.

Aero Digest, Aeronautical Digest Publishing Corp., 34 N. Crystal St., East Stroudsburg, Pa.

Aeronautical Engineering Review, Institute of Aeronautical Sciences, 2 E. 64th St., New York 21, N. Y. or 7660 Beverly Blvd., Los Angeles, Calif.

Aeroplane, Temple Press, Ltd., Bowling Green Lane, London E. C. 1, England

Agricultural Engineering, American Society of Agricultural Engineers, 505 Pleasant St., St. Joseph, Mich.

Air Pollution and Smoke Prevention Association of America, Inc., Pittsburgh, Pa.

Aircraft Engineering, Bunhill Publications Ltd., 12 Bloomsbury Square, London W.C. 1, England.

Aircraft Production, Iliffe & Sons, Ltd., Dorset House, Stamford St., London S.E. 1, England.

Alloy Casting Bulletin, Alloy Casting Institute, 32 Third Ave., Mineola, N. Y.

Alloy Metals Review, High Speed Steel Alloys, Ltd., Widness, Lancashire, England.

A. M. A. Archives of Industrial Hygiene and Occupational Medicine, American Medical Association, 535 N. Dearborn St., Chicago 10, Ill.

American Ceramic Society Bulletin, 2525 N. High St., Columbus 2, Ohio.

American Chemical Society, Journal, Special Publications Dept., American Chemical Society, 1155 Sixteenth St. N. W., Washington 6, D. C.

American Concrete Institute, Journal, 18263 W. McNichols Rd., Detroit 19, Mich.

American Documentation, Office of the Secretary, American Documentation Institute, Library of Congress, Washington, D. C.

American Electroplaters' Society, Proceedings, American Bldg., 445 Broad St., Newark 2, N. J.

American Foundryman, American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill.

American Gas Association Monthly, American Gas Association, American Bldg., Brattleboro, Vt., or 420 Lexington Ave., New York 17, N. Y.

American Gas Journal, 205 East 42nd St., New York 17, N. Y.

American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings, 29 W. 39th St., New York 18, N. Y.

American Institute of Mining and Metallurgical Engineers, Transactions, 29 W. 39th St., New York, 18, N. Y.

American Journal of Physics, American Institute of Physics, 57 E. 55th St., New York 22, N. Y.

American Machinist, 330 W. 42nd St., New York 36, N. Y.

American Paint Journal, 3713 Washington Ave., St. Louis 8, Mo.

American Paper Converter, (now changed to Paper, Film, and Foil Converter). Howard Publishing Co., 111 West Washington St., Chicago 2, Ill.

American Petroleum Institute, Proceedings, 50 W. 50th St., New York 20, N. Y.

American Pressman, International Printing Pressmen and Assistants' Union of North America, Pressmen's Home, Tenn.

American Printer, Moore Publishing Co., Inc., Emmett St., Bristol, Conn., or 48 W. 38th St., New York, N. Y.

American Railway Engineering Association Bulletin, 59 E. Van Buren St., Chicago 5, Ill., or 2211 Fordem Ave., Madison, Wis.

American Society of Mechanical Engineers, Transactions, 29 W. 39th St., New York 18, N. Y.

American Society of Naval Engineers, Inc., Journal, 605 F St., Washington 4, D. C.
American Waterworks Association, Journal, 521 Fifth Ave., New York 17, N. Y.
Analysts Journal, New York Society of Analysts, Room 908, 20 Broad St., New York 5, N. Y.
Analytica Chimica Acta, Elsevier Publishing Co., 402 Lovett Blvd., Houston, Tex.
Applications and Industry, American Institute of Electrical Engineers, 33 W. 39th St., New York 18, N. Y.
Applied Mechanics Reviews, American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.
Applied Scientific Research, Martinus Nighoff, The Hague, Netherlands.
Architectural Forum, Time and Life Building, 9 Rockefeller Plaza, New York 20, N. Y.
ASTM Bulletin, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.
Atomic Scientists News, Taylor & Francis, Ltd., Red Lion Court, Fleet St., London E.C. 4, England.
Australasian Engineer, 20 Loftus St., Sydney, Australia.
Australasian Institute of Mining and Metallurgy, Proceedings, Osborne House, 399 Little Collins St., Melbourne, Australia.
Australian Journal of Applied Science, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne C. 2, Victoria, Australia.
Automobile Engineer, Iliffe & Sons, Ltd., Dorset House, Stamford St., London S.E. 1, England.
Automotive Industries, Chilton Co., Chestnut and 56th Sts., Philadelphia 39, Pa.
Aviation Age, Conover-Mast Publications, Inc., 205 E. 42nd St., New York 17, N. Y.
Aviation Week, 330 W. 42nd St., New York 36, N. Y., or 99-129 N. Broadway, Albany 1, N. Y.

B

Battelle Technical Review, Battelle Memorial Institute, 505 King Ave. Columbus 1, Ohio.
Bell System Technical Journal, American Telephone and Telegraph Co., 195 Broadway, New York 7, N. Y.
Birmingham Metallurgical Society, Journal, 253 Longbridge Lane, Northfield, Birmingham 31, England.
Bituminous Coal Research, The National Research Agency of the Bituminous Coal Industry, 2609 First National Bank Bldg., Pittsburgh 22, Pa.
Blast Furnace and Steel Plant, Steel Publications, Inc., 4 Smithfield St., Pittsburgh 30, Pa.
Blast Furnace, Coke Ovens, and Raw Materials Proceedings, 29 W. 39th St., New York 18, N. Y.
Brick & Clay Record, Industrial Publications, Inc., 5 S. Wabash Ave., Chicago 3, Ill.
British Cast Iron Research Association, Journal of Research and Development, Alvechurch, Birmingham, England.
British Clayworker, 23 Tavistock St., London W.C. 2, England.
British Journal of Applied Physics, Institute of Physics, 47 Belgrave Square, London S.E. 1, England.
British Plastics, Iliffe & Sons, Ltd., Dorset House, Stamford St., London S.E. 1, England.
British Steelmaker, 7 Chesterfield Gardens, Mayfair, London W. 1, England.
Brown Boveri Review, Brown Boveri & Co., Ltd., Baden, Switzerland.
Bulletin of the Institution of Mining and Metallurgy, Salisbury House, Finsbury Circus, London E.C. 2, England.
Bureau of Ships Journal, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
Business Week, McGraw-Hill Publishing Co., 99-129 N. Broadway, Albany 1, N. Y.

C

California Journal of Mines and Geology, Department of Natural Resources, Division of Mines, Ferry Building, San Francisco 11, Calif.
Canadian Chemical Processing, Westman Publications, Ltd., 195 Bartely Drive, Toronto, Ont., Canada.
Canadian Journal of Chemistry, Division of Administration, National Research Council, Ottawa, Ont., Canada.

Canadian Journal of Physics, Division of Administration, National Research Council, Ottawa, Ont., Canada.

Canadian Journel of Technology, Division of Administration, National Research Council, Ottawa, Ont., Canada.

Canadian Metals, Westman Publications, Ltd., 195 Bartley Drive, Toronto, Ont., Canada.

Canadian Mining Journal, Gardenvale, Quebec, Canada.

Canadian Mining and Metallurgical Bulletin, Canadian Institute of Mining and Metallurgy, 911 Drummond Bldg., Montreal, Quebec, Canada.

Carnegie Institute of Technology, Mechanical Engineering Department, 4400 Forbes St., Pittsburgh 13, Pa.

Castings Research Laboratory Report, The Casting Research Laboratory, Waseda University, Tokyo, Japan.

Ceramics, Arrow Press, Ltd., 157 Hagden Lane, Watford, Herts, England.

Chemical Age, Bouverie House, 154 Fleet St., London E.C. 4, England.

Chemical Engineering, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36 N. Y.

Chemical Engineering Progress, F. J. Van Antwerpen, American Institute of Chemical Engineers, 120 E. 41st St., New York 17, N. Y.

Chemical & Process Engineering, Leonard Hill, Ltd., Stratford House, 9 Eden St., London N.W. 1, England, or British Publications Inc., 150 E. 35th St., New York 16, N. Y.

Chemical Reviews, Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore 2, Md.

Chemical Society, Journal, Burlington House, London W. 1, England.

Chemical Week, 330 W. 42nd St., New York 36, N. Y., or 1309 Noble St., Philadelphia 23, Pa.

Chemist Analyst, J. T. Baker Chemical Co., Phillipsburg, N. J.

Chemistry & Industry, Society of Chemical Industry, 56 Victoria St., London S.W. 1, England.

Chemistry in Canada, Consolidated Press Ltd., 73 Richmond St., West Toronto, Ont., Canada.

Civil Engineering, American Society of Civil Engineers, 33 W. 39th St., New York 18, N. Y.

Claycraft, London & Sheffield Publishing Co., Ltd., 7 Chesterfield Gardens, Curzon St., Mayfair, London W. 1, England.

Coal Age, 1309 Noble St., Philadelphia 23, Pa., or 330 W. 42nd St., New York 36, N. Y.

Coke and Gas, Tothill Press, Ltd., 33 Tothill St., Westminster, London S. W. 1, England.

Colorado School of Mines, Quarterly, Colorado School of Mines, Golden, Colo.

Combustion, Combustion Publishing Co., Inc., 200 Madison Ave., New York 16, N. Y.

Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Kalgoorlie, Australia.

Commonwealth Scientific and Industrial Research Organization and Mining Department, Universtiy of Melbourne, Melbourne, Australia.

Communication and Electronics, American Institute of Electrical Engineers, 33 W. 39th St., New York 18, N. Y.

Consulting Engineer, Industry and Power Publishing Co., 420 Main St., St Joseph, Mich.

Copper & Brass Bulletin, Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

Corrosion, National Association of Corrosion Engineers, 1061 M & M Building, No. 1 Main St., Houston 2, Tex.

D

Diesel Power and Diesel Transportation, Diesel Publications, Inc., 192 Lexington Ave., New York 16, N. Y.

Discovery, Jarrold & Sons, Ltd., Norwich, England.

Drilling, Associated Publishers, Inc., 2115 N. St. Paul St., Dallas 1, Tex.

Drug & Cosmetic Industry, Drug Markets, Inc., 101 W. 31st St., New York 1, N. Y.

E

Edgar Allen News, Edgar Allen Steel Co. Div., A. Milne & Co., 741-3-5 Washington St., New York, N. Y.

Electrical Light and Power, Harwood Publishing Co., 22 E. Huron St., Chicago 11, Ill.

Electrical Communications, International Telephone & Telegraph Corp., 67 Broad St., New York 4, N. Y.
Electrical Engineering, American Institute of Electrical Engineers, 33 W. 39th St., New York 18, N. Y.
Electrical Manufacturing, Gage Publishing Co., 1250 6th Ave., New York 36, N. Y.
Electrical World, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y.
Electrochemical Society, Journal, 216 W. 102nd St., New York 25, N. Y.
Electrodepositors' Technical Society, Journal, 27 Islington High St., London N. 1, England.
Electronics, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y.
Electroplating and Metal Finishing, 83-85 Udney Park Rd., Teddington, Middlesex, England.
Engineer, 28 Essex St., Strand, London W.C. 2, England.
Engineering, 35-36 Bedford St., Strand, London W.C. 2, England.
Engineering and Mining Journal, 1309 Noble St., Philadelphia 23, Pa., or 330 W. 42nd St., New York 36, N. Y.
Engineering Experiment Station News (Ohio State University), Columbus, Ohio
Engineering Journal, Engineering Institute of Canada, 2050 Mansfield St., Montreal, Quebec, Canada.
Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., or 99-129 N. Broadway, Albany 1, N. Y.
Engineers' Digest, 120 Wigmore St., London W. 1, England, or 366 Madison Ave., New York 17, N. Y.

F

Faraday Society, Transactions, The Aberdeen University Press, Ltd., 6 Upper Kirkgate, Aberdeen, Scotland.
Factory Management and Maintenance, 330 W. 42nd St., New York 36, N. Y., or 99-129 N. Broadway, Albany 1, N. Y.
Finish, Dana Chase Publications, 360 N. Michigan Ave., Chicago, Ill.
Flow, 1240 Ontario St., Cleveland 13, Ohio.
Foote Prints, Foote Mineral Co., 18 W. Chelton Ave., Philadelphia, 44, Pa.
Fortune, 540 N. Michigan Ave., Chicago 11, Ill.
Foundry, Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio.
Foundry Trade Journal, 49 Wellington St., Strand, London W.C. 2, England.
Franklin Institute, Journal, Benjamin Franklin Parkways and 20th St., Philadelphia, Pa.
Fuel, Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y.
Fueloil & Oil Heat, Heating Publishers, Inc., 2 W. 45th St., New York 36, N. Y.

G

Gas Age, 48 W. 38th St., New York 18, N. Y.
Gas Times, Arrow Press Ltd., 157 Hagden Lane, Watford, Herts, England.
General Electric Review, Schenectady 5, N. Y.
General Motors Engineering Journal, General Motors Bldg., 3044 W. Grand Blvd., Detroit 2, Mich.
Graphic Arts Monthly, Graphic Arts Publishing Co., 608 S. Dearborn St., Chicago 5, Ill.

H

Heating and Ventilating, The Industrial Press, 148 Lafayette St., New York 13, N. Y.
Heating, Piping & Air Conditioning, Keeney Publishing Co., 6 N. Michigan Ave., Chicago, 2, Ill.

I

Industrial Waste Conference, Seventh, Proceedings, Purdue University, Lafayette, Ind.
Inco Magazine, International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
India Rubber World, 386 Fourth Ave., New York 16, N. Y.
Industrial and Engineering Chemistry, Special Publications Office, American Chemical Society, 1155 Sixteenth St. N. W., Washington 6, D. C.
Industrial Chemist, 33 Tothill St., Westminister, London S.W. 1, England.

Industrial Diamond Review, N.A.G. Press, Ltd., 226 Latymer Court, Hammersmith, London W. 6, England.
Industrial Finishing, Practical Publications, Inc., 1142 N. Meridian St., Indianapolis 4, Ind.
Industrial Gas, Moore Publishing Co., Inc., Emmett St., Bristol, Conn.
Industrial Heating, National Industrial Publishing Co., Union Trust Bldg., Pittsburgh 19, Pa.
Industrial Marketing, Advertising Publications, Inc., 200 E. Illinois St., Chicago 11, Ill.
Industry and Power, Maujer Publishing Co., 420 Main St., St. Joseph, Mich.
Industry & Welding, Industrial Publishing Co., 1240 Ontario St., Cleveland 13, Ohio.
Institute of British Foundrymen, Proceedings, St. John St., Chambers, Deansgate, Manchester 3, England.
Institute of Fuel, Journal, 18 Devonshire St., Portland Place, London, W. 1, England.
Institute of Metals, Bulletin, 4 Grosvenor Gardens, London S.W. 1, England.
Institute of Metals, Journal, 4 Grosvenor Gardens, London S.W. 1, England.
Institute of Petroleum Review, 26 Portland Place, London W. 1, England.
Institute of Petroleum, Journal, 26 Portland Place, London W. 1, England.
Institute of Welding, Transactions, 2 Buckingham Palace Gardens, London S.W. 1, England.
Institute Spokesman, National Lubricating Grease Institute, 4638 J. C. Nichols Pkwy., Kansas City 2, Mo.
Institution of Electrical Engineers, Proceedings, Savoy Place, London W. C. 2, England.
Institution of Engineers & Shipbuilders in Scotland, Transactions, 151 Elmbank Crescent, Glasgow C. 2, Scotland.
Institution of Mining and Metallurgy, Bulletin, Transactions, Salisbury House, Finsbury Circus, London E.C. 2, England.
Instrumentation, Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne and Windrim Ave., Philadelphia 44, Pa.
Instruments, Instruments Publishing Co., Inc., 845 Ridge Ave., Pittsburgh 12, Pa.
Iron Age, Chilton Co., Inc., 100 E. 42nd St., New York 17, N. Y.
Iron & Steel, Louis Cassier Co., Ltd., Dorset House, Stamford St., London S,E. 1, England.
Iron and Steel Engineer, Association of Iron and Steel Engineers, 1010 Empire Bldg., Pittsburgh 22, Pa.
Iron and Steel Institute, Journal, 4 Grosvenor Gardens, London S. W. 1, England.

J

Journal of the Aeronautical Sciences, Institute of the Aeronautical Sciences, Inc., 2 E. 64th St., New York 21, N. Y.
Journal of the American Chemical Society, Special Publications Dept., American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D. C.
Journal of American Society of Naval Engineers, 605 F St., N.W., Washington 4, D. C.
Journal of American Water Works Association, 521 Fifth Ave., New York 17, N. Y.
Journal of Applied Chemistry, Society of Chemical Industry, 56 Victoria St., London S.W. 1, England.
Journal of Applied Mechanics, American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.
Journal of Applied Physics, American Institute of Physics, 57 E. 55th St., New York 22, N. Y.
Journal of the Birmingham Metallurgical Society, 253 Longbridge Lane, Northfield, Birmingham 31, England.
Journal of Chemical Education, Division of Chemical Education of the American Chemical Society, 20th and Northhampton Sts., Easton, Pa.
Journal of Chemical Physics, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Journal of the Electrochemical Society, Mount Royal and Guilford Aves., Baltimore 2, Md.
Journal of the Electrodepositors' Technical Society, 27 Islington High St., London N. 1, England.
Journal of the Franklin Institute, Benjamin Franklin Parkways and 20th St., Philadelphia, Pa.

Journal of the Indian Institute of Science, Bangalore 3, India.

Journal of the Institute of Fuel, 18 Devonshire St., Portland Place, London W. 1, England.

Journal of the Institute of Metals, 4 Grosvenor Gardens, London S. W. 1, England.

Journal of the Iron and Steel Institute, 4 Grosvenor Gardens, London S.W. 1, England.

Journal of the Mechanics and Physics of Solids, Pergamon Press, Ltd., 242 Marylebone Rd., London, N.W. 1, England.

Journal of Metals, Metals Branch, American Institute of Mining and Metallurgical Engineers, Inc., 29 W. 39th St., New York 18, N. Y.

Journal of Photographic Science, The Royal Photographic Society, 16 Princes Gate, London S.W. 7, England.

Journal of Physical Chemistry, American Chemical Society, 1155 Sixteenth St., N.W. Washington 6, D. C.

Journal of Rational Mechanics and Analysts, Graduate Institute for Applied Mathematics, Indiana University, Bloomington, Ind.

Journal of Research of the National Bureau of Standards, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Journal of the Royal Aeronautical Society, 4 Hamilton Place, London W. 1, England.

Journal of the Royal Microscopical Society, Tavistock House South, Tavistock Square, London W.C. 1, England.

Journal of Scientific & Industrial Research, Assistant Secretary, (Publications), Old Mill Rd., New Delhi 2, India.

Journal of Scientific Instruments, Institute of Physics, 47 Belgrave Square, London S.W. 1, England.

L

Laboratory Practice, United Trade Press, Ltd., 9 Gough Square, Fleet St., London, E.C. 4, England.

Light Metal Age, 220 S. State St., Chicago 4, Ill.

Light Metals, Temple Press, Ltd., Bowling Green Lane, London E.C. 1, England.

Linde Tips and Oxy-Acetylene Tips, Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

Lubrication, The Texas Co., 135 E. 42nd St., New York 17, N. Y.

Lubrication Engineering, American Society of Lubrication Engineers, 343 S. Dearborn St., Chicago 4, Ill.

M

Machine and Tool Blue Book, Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, Ill.

Machine Design, Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio.

Machinery (American), Industrial Press, Emmett St., Bristol, Conn.

Machinery (London), Machinery Publishing Co., Ltd., National House, West St., Brighton 1, England.

Machinery Lloyd, Continental & Overseas Organization Ltd., 6 Cavendish Place, Regent St., London W. 1, England.

Magnesium, Brooks and Perkins Inc., 1950 W. Fort St., Detroit 16, Mich.

Magnesium Review and Abstracts, Magnesium Elektron Ltd., Clifton Junction, N. Manchester, England.

Mainspring, Associated Spring Corp., Bristol, Conn.

Materials & Methods, Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y.

Mechanical Engineering, American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y.

Mechanical World and Engineering Record, Emmott & Co., Ltd., 31 King St. West, Manchester 3, England.

Metal Age, Metal Information Bureau Ltd., Birkett House, 27 Albermarle St., London W. 1, England.

Metal Bulletin, Metal Information Bureau Ltd., Birkett House, 27 Albemarle St., London W. 1, England.

Metal Finishing, Finishing Publications, Inc., 381 Broadway, Westwood, N. J.

Metal Industry, Louis Cassier Co., Ltd., Dorset House, Stamford St., London S.E. 1, England.

Metal Progress, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Metal Treating, Metal Treating Institute, 271 North Ave., New Rochelle, N. Y.
Metal Treatment and Drop Forging, Industrial Newspapers, Ltd., 49 Wellington St., Strand, London W.C. 2, England.
Metal Trends, American Brake Shoe Co., 230 Park Ave., New York 17, N. Y.
Metal-Working, Sutton Publishing Co., Inc., 172 South Broadway, White Plains, N. Y.
Metallurgia, The Kennedy Press, Ltd., 31 King Street West, Manchester 3, England.
Metals, Atlas Publishing Co., 425 W. 25th St., New York 1, N. Y.
Midwest Engineer, Western Society of Engineers, 84 E. Randolph St., Chicago 1, Ill.
Mine and Quarry Engineering, Tothill Press Ltd., 33 Tothill St., London S.W. 1, England.
Mineral Industries, School of Mineral Industries, Pennsylvania State College, State College, Pa.
Mines Magazine, Colorado School of Mines Alumni Assn., Frank C. Bowman, Editor, 734 Cooper Bldg., Denver 2, Colo.
Mining Congress Journal, American Mining Congress, Ring Bldg., Washington 6, D. C.
Mining Engineering, American Institute of Mining and Metallurgical Engineers, 29 W. 39th St., New York 18, N. Y.
Mining Journal, 15 Wilson St., Moorgate, London E.C. 2, England.
Mining Magazine, Mining Publications, Ltd., Salisbury House, London E.C. 2, England.
Mining World, Emmett St., Bristol, Conn.
Modern Industrial Press, Andersen, Inc., Windsor Manor, Post Office Box 687, Pittsburgh 30, Pa.
Modern Lithography, Industry Publications, Inc., 175 Fifth Ave., New York 10, N. Y.
Modern Machine Shop, Gardner Publications, Inc., 431 Main St., Cincinnati 2, Ohio.
Modern Metals, Modern Metals Publishing Co., 435 N. Michigan Ave., Chicago 11, Ill.
Modern Packaging, Modern Packaging Corp., 575 Madison Ave., New York 22, N. Y.
Modern Plastics, Breskin Publications, Inc., 575 Madison Ave., New York 22, N. Y.
Modern Refrigeration, Refrigeration House, Victoria Rd., Working, Surrey, England.
Monthly Bulletin of Statistics, United Nations, Sales and Circulation Section, United Nations, New York, N. Y.
Monthly Business Review, Federal Reserve Bank of Cleveland, Cleveland 1, Ohio.

N

National Academy of Sciences, Proceedings, 2101 Constitution Ave., Washington 25, D. C.
National Advisory Committee for Aeronautics, 1724 F St., N.W., Washington 25, D. C.
National Bureau of Standards Technical News Bulletin, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
National Lithographer, The National Lithographer Publishing Co., 11 Park Place, New York, N. Y.
Nature, MacMillan & Co., Ltd., St. Martin's St., London, W.C. 2, England.
Nondestructive Testing, 1109 Hinman Ave., Evanston, Ill.
North East Coast Institution of Engineers & Shipbuilders, Transactions, Newcastle on Tyne, England.
Nucleonics, McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y.

O

Oil and Gas Journal, Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Okla.
Ontario Hydro Research News, Research Division, Hydro-Electric Power Commission of Ontario, Toronto, Ont., Canada.
Operational Research Quarterly, Operational Research Club, 11 Park Lane, London W. 1, England.
Optical Society of America Journal, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Ordnance, American Ordnance Association, 705 Mills Bldg., Washington 6, D. C.
Organic Finishing, Finishing Publications, Inc., 381 Broadway, Westwood, N. J.

Overseas Engineer, Temple Press, Ltd., Bowling Green Lane, London E.C. 1, England.

P

Pacific Printer and Publisher, Pacific Printer, Publisher, and Lithographer, Pier Seven, San Francisco 11, Calif.

Paint and Varnish Production, Powell Magazine Inc., 855 Ave. of America, New York 1, N. Y.

Paint Industry Magazine, Heckel Publishing Co., Inc., 1321 Arch St., Philadelphia 7, Pa.

Paint Manufacture, Leonard Hill, Ltd., Stratford House, 9 Eden St., London N.W. 1, England.

Paper, Film, and Foil, Howard Publishing Co., 111 West Washington St., Chicago 2, Ill.

Petroleum, Leonard Hill Ltd., Stratford House, 9 Eden St., London N.W. 1, England.

Petroleum Engineer, 15th Floor, 1700 Commerce St., Dallas 1, Tex.

Petroleum Refiner, The Gulf Publishing Co., Box 2608, Houston 1, Tex.

Petroleum Times, Brettenham House, Lancaster Place, Strand, London W.C. 2, England, or 545 Fifth Ave., New York 17, N. Y.

Philips Research Reports, N. V. Philips' Gloeilampenfabrieken, Technical and Scientific Literature Dept., Eindhoven, Netherlands.

Philips Technical Review, (same as Philips Research Reports.)

Philosophical Magazine, Messrs. Taylor and Francis Ltd., Red Lion Court, Fleet St., London E.C. 4, England.

Physical Review, American Institute of Physics, 57 East 55th St., New York 22, N. Y.

Physical Society, Proceedings, 1 Lowther Gardens, Prince Consort Rd., London S.W. 7, England.

Physics Today, American Institute of Physics, 57 East 55th St., New York 22, N. Y.

Pipe Line News, Oildom Publishing Co., 101 W. Alabama St., Houston, Tex.

Pit and Quarry, Pit and Quarry Publications, Inc., 431 S. Dearborn St., Chicago 5, Ill.

Plastics Institute, Transactions, The Adelphi, Adam St., London W.C. 2, England.

Plating, American Electroplaters' Society, American Bldg., 445 Broad St., Newark 2, N. J.

Powder Metallurgy Bulletin, Dr. Paul Schwarzkoff, Pres., American Electro Metal Corp., 320 Yonkers Ave., Yonkers 2, N. Y.

Power, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36, N. Y.

Power Apparatus and Systems, American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.

Power Engineering, Technical Publishing Co., 110 S. Dearborn St., Chicago 3, Ill.

Precision Metal Molding, 1240 Ontario St., Cleveland 13, Ohio.

Proceedings of the Institution of Electrical Engineers, Savoy Place, London W. C. 2, England.

Proceedings of the Royal Society, Cambridge Univ. Press, Bentley House, London, N. W. 1, England, or 32 East 57th St., New York 22, N. Y.

Proceedings of the Seventh Industrial Waste Conference, Purdue University, Lafayette, Ind.

Product Engineering, McGraw-Hill Publishing Co., Inc., 99-129 N. Broadway, Albany 1, N. Y.

Product Finishing, Sawell-Publications Ltd., 4 Ludgate Circus, London E.C. 4, England.

Products Finishing, Gardner Publications, Inc., 431 Main St., Cincinnati 2, Ohio.

Pulp & Paper, Miller Freeman Publications, Inc., Emmett St., Bristol, Conn.

Q

Quarterly of Applied Mathematics, Brown University, Providence 12, R. I.

Quarterly Journal of Mechanics and Applied Mathematics, Oxford University Press, Amen House, London E. C. 4, England.

R

Railway Age, Simmons-Boardman Publishing Corp., 30 Church St., New York 7, N. Y.

Railway Engineering and Maintenance, Simmons-Boardman Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.

Railway Gazette, 33 Tothill St., Westminster, London S.W. 1, England.
Railway Locomotives and Cars, Simmons-Boardman Publishing Corp., 1309 Noble St., Philadelphia, Pa.
Railway Track and Structures, Simmons-Boardman Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.
RCA Review, RCA Laboratories Div. Radio Corp. of America, Princeton, N. J.
Refractories Journal, London and Sheffield Publishing Co., Ltd., Curzon St., Mayfair, London W. 1, England.
Refrigeration Engineering, American Society of Refrigerating Engineers, 40 W. 40th St., New York 18, N. Y.
Research, Butterworth Scientific Publications, 88 Kingsway, London W.C. 2, England.
Research Reviews, Code 740, Office of Naval Research, Washington, D. C.
Review of Scientific Instruments, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Reviews of Modern Physics, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Rock Products, MacLean-Hunter Publishing Corp., 309 W. Jackson Blvd., Chicago 6, Ill.
Royal Aeronautical Society, Journal, 4 Hamilton Place, London W. 1, England.
Royal Society, Proceedings, Cambridge University Press, 32 East 57th St., New York 22, N. Y., or Bently House, London, N.W. 1, England.

S

SAE Journal, Society for Automotive Engineers, Inc., 29 W. 39th St., New York 18, N. Y.
Science, 1515 Massachusetts Ave., N. W., Washington 5, D. C.
Science Progress, Edward Arnold and Co., 41 Maddox St., London W. 1, England.
Science Reports of the Research Institute, Tohoku University, Sendai, Japan.
Scientific American, 2 W. 45th St., New York 36, N. Y.
Screw Machine Engineering, Screw Machine Publishing Co., 65 Broad St., Rochester 14, N. Y.
Sewage and Industrial Wastes, 325 Illinois Bldg., Champaign, Ill.
Sheet Metal Industries, Industrial Newspaper, Ltd., 49 Wellington St., Strand, London W.C. 2, England.
Sheet Metal Worker, 92 Martling Ave., Tarrytown, N. Y.
Soap and Sanitary Chemicals, MacNair-Dorland Co., 254 W. 31st St., New York 1, N. Y.
Society of Motion Picture and Television Engineers, Journal, 40 W. 40th St., New York 18, N. Y.
Southern Pulp and Paper Manufacturer, Ernest H. Abernethy Publishing Co., Inc., 75 Third St., N.W., Atlanta, Ga.
SPE Journal, Society of Plastics Engineering, Inc., 513 Security Bank Bldg., Athens, Ohio.
Standardization, American Standards Association, Inc., 70 E. 45th St., New York 17, N. Y.
Steel, Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio.
Steel Equipment & Maintenance News, 528 Washington Rd., Pittsburgh 28, Pa.
Steel Founders' Society of America, Midland Bldg., Cleveland, Ohio.
Steel Horizons, Allegheny Ludlum Steel, Corp., Pittsburgh, Pa.
Steel Processing, Steel Publications, Inc., 4 Smithfield St., Pittsburgh 30, Pa.
Steelways, American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.
Stove Builder, The Institute of Cooking and Heating Appliance Manufacturers, Shoreham Hotel, Washington 8, D. C.
Sylvania Technologist, Sylvania Electric Products, Inc., Sylvania Center, Bayside, N. Y.

T

Tappi, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y.
Technology Reports of the Tohoku University, Faculty of Engineering, Tohoku University, Sendai, Japan.
Technology Review, Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass.
Tele-Tech, 480 Lexington Ave., New York N. Y.
Texas Engineering Experiment Station, Bulletin, Texas A. and M College System, College Station, Tex.
Times Review of Industry, Printing House Square, London, E.C. 4, England.
Times Science Review, The Times, London E.C. 4, England.
Tin and Its Uses, International Tin Study Group, 7 Carel van Bylandtlaan, The Hague, Netherlands.

Tool Engineer, American Society of Tool Engineers, 239 E. Chicago St., Milwaukee, Wis.
Trend in Engineering, 127 More Hall, University of Washington, Seattle 5, Wash.

U

University of Illinois Engineering Experiment Station, Urbana, Ill.
U. S. Atomic Energy Commission, Documents Publications Section, Technical Information Service, Oak Ridge, Tenn.
U. S. Bureau of Mines, Office of Technical Services, Department of Commerce, Washington 25, D. C.

V

Vacuum, W. Edwards & Co., Ltd., Worsley Bridge Rd., Lower Sydenham, London S.E. 26, England.
Virginia Polytechnic Institute Engineering Experiment Station, Blacksburg, Va.

W

Water & Sewage Works, 155 E. 44th St., New York 17, N. Y.
Welder, Murex Welding Processes, Ltd., Waltham Cross, Herts, England.
Welding Engineer, 871 N. Franklin St., Chicago 10, Ill., or 330 W. 42nd St., New York 36, N. Y.
Welding Journal, American Welding Society, 33 W. 39th St., New York 18, N. Y.
Welding and Metal Fabrication, Louis Cassier Co., Ltd., Dorset House, Stamford St., London S.E. 1, England.
Welding Research, British Welding Research Association, 29 Park Crescent, London W. 1, England.
Western Machinery and Steel World, 681 Market St., San Francisco 5, Calif., or 8943 Wilshire Blvd., Beverly Hills, Calif.
Western Metals, 198 S. Alvarado St., Los Angeles 5, Calif.
Westinghouse Engineer, P. O. Box 2278, 3 Gateway Center, Pittsburgh 30, Pa.
Wire Industry, 33 Furnival St., London E.C. 4, England.
Wire and Wire Products, 1 Sherman Ave., Jersey City, N. J.
Wireless World, Iliffe & Sons, Ltd., Dorset House, Stamford St., London S.E. 1, England.
World Oil, Gulf Publishing Co., 3301 Buffalo Dr., Houston 6, Tex.

II. FOREIGN LANGUAGE PERIODICALS

Most of the foreign journals (except Russian) are available through Stechert-Hafner, Inc., 31 E. 10th St., New York 3, N. Y. The Russian journals can be ordered from Four Continent Book Corp., 38 W. 58th St., New York 16, N. Y.

The addresses listed here follow the style used by the country of origin and also the language of origin, except for the country itself, which is given in English. Exact adherence to the style shown for addressing envelopes will greatly facilitate mail deliveries. In some countries (Germany, Austria, Russia) the name of the city precedes the street address. In these instances the name of the city is underlined to avoid confusion with the street address.

A

Abhandlungen der Braunschweigischen Wissenschaftlichen Gesellschaft
Friedr. Vieweg & Sohn, Verlag
Braunschweig
Germany

Aciers Fins & Spéciaux Francais
La Chambre Syndicale des Producteurs d'Aciers Fins et Spéciaux
12, Rue de Madrid
Paris (VIII^{e})
France

Acta Chemica Scandinavica
Messrs. Ejnar Munksgaard
Nörregade 6
Copenhagen
Denmark

Acta Crystallographica
Messr. Ejnar Munksgaard
Nörregade 6
Copenhagen
Denmark

Acta Physica Austriaca
Springer-Verlag
Wien I
Mölkerbastei 5
Austria

Acta Polytechnica, Physics and Applied Mathematics Series
Swedish Academy of Engineering Sciences
Stockholm
Sweden

Acta Technica Academiae Scientiarum Hungaricae
"Kultúra" Könyv és Hírlap Küldereskedelmi Vállalat
Budapest, VI.
Sztálin-út 21
Hungary

Akustische Beihefte
S. Hirzel
Claridenhof
Gotthardstrass 6
Zürich
Switzerland

Alluminio
Instituto Sperimentale dei Metalli Leggeri
Via della Posta 8/10
Milano
Italy

Aluminium
Verlag der Aluminium-Zentrale e.V.
Düsseldorf
Alleestrasse 31
Germany

Aluminium Ranshofen, Mitteilungen
Österreichische Metallwerke Aktiengessllschaft
Wien I
Freyung 1
Austria

Aluminium Suisse
A. G. Fachschriften - Verlag & Buchdruckerei
Stauffacherquai 40
Zürich 4
Switzerland

Analytica Chimica Acta
Elsevier Publishing Co.
110-112 Spuistraat
Amsterdam-c
The Netherlands

Angewandte Chemie
Verlag Chemie, GmbH.
(17a) Weinheim/Bergstrasse
Pappelallee 3
Germany

Annalen der Physik
Johann Ambrosius Barth
Leipzig C 1
Salomonstr. 18 B
Germany

Applied Scientific Research
Martinus Nighoff
The Hague
Netherlands

Archiv für das Eisenhüttenwesen
Verlag Stahleisen GmbH.
Düsseldorf
Breite Strasse 27
Germany

Archiv für Technisches Messen
R. Oldenbourg Verlag
München
Lotzbechstrasse 2b
Germany

Arkiv för Fysik
Almqvist & Wiksells Boktryckeri AB
Stockholm
Sweden

Arkiv för Kemi
Almqvist & Wiksells Boktryckeri AB
Stockholm
Sweden

Associacao Brasileira de Metais, Boletim
Instituto de Pesquisas Technologicas
Praca Cel. Fernando Prestes, 110
Sao Paulo
Brazil

Avtogennoe Delo
Glavkislorod
Moskva, Spartakovskaya 2a
(Moscow, U.S.S.R.)

B

Berg-und Hüttenmännische Monatshefte der Montanistischen Hochschule in Leoben
Springer-Verlag
Wien I
Mölkerbastei 5
Austria

Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.V.
Deutsche Keramische Gesellschaft e.V. und des Verein Deutscher Emailfachleute e.V.
Bonn-Rh.
Poppelsdorfer Allee 15
Germany

Brennstoff-Chemie
Ernst Terres, Carl Engler und Hans Bunte-Institute für Mineralöl-und Kohleforschung und Gasinstitut der Technischen Hochschule
Karlsruhe
Germany

Brennstoff-Wärme-Kraft
Deutscher Ingenieur-Verlag GmbH.
Düsseldorf
Ingenieurhaus, Prinz - Georg - Strasse 77/79
Germany

C

Casting Research Laboratory Report
The Casting Research Laboratory
Waseda University
Tokyo
Japan

Chaleur & Industrie
Henry Cassan
2 Rue des Tanneries
Paris (XIII^{e})
France

Chemical Metallurgical & Mining Society of South Africa, Journal
Kelvin House
Marshall and Hollard Sts.,
Johannesburg
South Africa

Chemie-Ingenieur-Technik
Verlag Chemie, GmbH.
(17a) Weinheim/Bergstrasse
Pappelallee 3
Germany

Chemische Technik
Verlag Technik
Berlin NW 7
Unter den Linden 12
Germany

Chimia
Rascher-Verlag
Zürich
Switzerland

Ciencia y Tecnica de la Soldadura
Instituto de la Soldadura
Goya, 58
Madrid
Spain

Circulaire d'Informations Techniques
Centre de Documentation Sidérurgique
6, Rue de Lota
Paris (16^{e})
France

Comptes Rendus (hebdomadaires des Séances de l'Académie des Sciences)
Gauthier-Villars
55 Quai des Grands-Augustins
Paris (6^{e})
France

D

Doklady Akademii Nauk SSSR
Moskva, Pushkinskaia ul., Dom 23
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina
Gosudarstvennoe Izdatel'stvo Sel'skokhoziaistvennoi Literatury
Moskva, B. Khariton'evskii pereulik, 21
(Moscow, U.S.S.R.)

Draht (Wire) (Eng. Edit.)
Prost & Meiner-Verlag
(13a) Coburg/Ofr.
Bahnhofstrasse 31
Germany

E

Elektrichestvo
Gosenergoizdat
Moskva, Glavnyi Pochtamt
Pochtovyi Iashchik no. 648
(Moscow, U.S.S.R.)

Elektrotechnika
Nehézipair Könyv- és Folyóiratkiadó Vállat
Budapest, V., Nagy Sándor-utca 6
Hungary

Engenharia, Mineracao e Metalurgia
Revista de Mineracao e Metalurgia Ltda.
Rua Seta de Setembro, 135 - 3.º
Rio de Janeiro
Brazil

Erdöl und Kohle
Industrieverlag von Hernhaussen, Kommanditgesellschaft
Hamburg 11
Rödingsmarkt 24
Germany

Esabs Tidning Svetsaren
Elektriska Svetsningsaktiebolaget
Göteborg 8
Sweden

Experientia
Verlag Birkhäuser AG
Basel 10
Elisabethenstrasse 15
Switzerland

F

Flamme et Thermique
5, Rue Michel-Ange
Paris (XVI^{c})
France

Fonderie
Éditions Techniques des Industries de la Fonderie
12, Avenue Raphaël
Paris (16^{e})
France

Forschung auf dem Gebiete des Ingenieurwesens
Deutscher Ingenieur-Verlag GmbH.
Düsseldorf
Germany

Frequenz
Fachverlag Schule & Schön
Berlin SW 29
Boppstrasse 10
Germany

Fusion de Metals
Prof. Enedelio Garza G.
Apartado 667
Monterrey, N.L.,
Mexico

G

Gas -und Wasserfach
R. Oldenbourg-Verlag
München 1
Postfach
Germany

Giesserei
Giesserei-Verlag GmbH.
Düsseldorf
Breite Strasse 27
Germany

Gjuteriet
Floragatan 5, n.b.
Stockholm
Sweden

H

Helvetica Chimica Acta
Schweizerische chemische Gesellschaft
Basel 7
Schweiz
(Switzerland)

Helvetica Physica Acta
Verlag-Birkhauser A.G.
Basel 7
Schweiz
(Switzerland)

Hutnicke Listy
Mucednicka 8
Brünn-Zabovresky
Czechoslovakia

Hutnik
U1. Stawowa 19
Katowice
Poland

I

Indian Institute of Science, Journal
Indian Institute of Science
Bangalore 3,
India

Institution of Engineers & Shipbuilders in Scotland, Transactions
151 Elmbank Crescent
Glasgow c.2,
Scotland

IVA
Scientific Engineering Research
Royal Swedish Academy of Engineering Sciences
Stockholm
Sweden

Izvestiia Akademii Nauk SSSR Sect. of Tech. and Chem. Sciences
Moskva, Pushkenskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

J

Japan Science Review, Engineering Sciences
Assoc. for Science Doc. Information
c/o Tokyo Inst. of Technology
Oh-Okayama, Meguro-Kw
Tokyo
Japan

Jernkontorets Annaler
Bergsingenjör Einar Öhman
Kungsträdgardsgatan 6
Stockholm C
Sweden

Journal de Chimie Physique et de Physico-Chemie Biologique
Société de Chimie Physique
École Nationale Supérieure de Chimie
11, Rue Pierre-Curie
Paris (5^{e})
France

Journal du Four Électrique et des Industries Électrochimiques
Publications Miniéres et Métallurgiques
86, Rue Cardinet
Paris (17^{e})
France

Journal d'Informations Techniques des Industries de la Fonderie
Centre Technique des Industries de la Fonderie
12, av. Raphaël
Paris (16^{e})
France

Journal de la Soudure
Stauffacherquai 36
Zürich 1
Switzerland

Journal des Rescherches du Centre National de la Recherche Scientifique
Centre National de la Recherche Scientifique
13, Quai Anatole-France
Paris (VII^{e})
France

Journal of Mechanical Laboratory (Japanese)
Government Mechanical Laboratory
Sumeyoshi-cho Suginamiku
Tokyo
Japan

Journal of Scientific & Industrial Research
The Assistant Secretary or the Editor (Publications)
Old Mill Rd.
New Delhi 2
India

K

Khodil'naia Teknika
Moskva 29, U1. Talalikhina, 26
(Moscow, U.S.S.R.)

Kohászati Lapok
Nehézipari Könyv- és Folyóiratkiadó Vállalat
Budapest, V., Nagy Sándor-utca 6
Hungary

Kolloid Zeitschrift
Verlag Dr. Dietrich Steinkopff
Darmstadt
Holzhofallee 35
Germany

Közlekedéstudományi Szemle
Posta Központi Hírlap Iroda
Budapest, V., Jósef nádor-tér 1
Hungary

Kungl. Tekniska Högskoland Handlingar
A. B. Hendrick Lindstahls Bokhandel i Distribution
Stockholm
Sweden

Kunststoffe
Carl Hanser Zeitschriftenverlag GmbH.
München 27
Leonhard-Eck-Str. 7
Germany

L

L'Ossature Metallique
Le Centre Belgo-Luxembourgeois d'Information de l'Acier
154 Avenue Louise
Bruxelles
Belgium

M

Magyar Hiradástechnika
Nehézipari Könyv- és Folyóiratkiadó Vállalat
Budapest, V., Nagy Sándor-utca 6
Hungary

Magyar Kémikusok Lapja
Nehézipari Könyv- és Folyóiratkiadó Vállalat
Budapest, V., Nagy Sándor-utca 6
Hungary

Memoirs of the Faculty of Engineering, Kyoto University
Kyoto University
Kyoto
Japan

Metalen
Drukkerij-Uitgeverij "De Hofstad"
Scheepmakersstraat 1-3
's-Gravenhage
Netherlands

Metall
Metall-Verlag GmbH.
Berlin-Grunewald
Hubertusallee 18
Germany

Metalloberfläche
Carl Hanser Zeitschriftenverlag GmbH.
München 27
Geonhard-Eck-Strasse 7
Germany

Metallurgia Italiana
Associazione Italiana di Metallurgia
Milano
Via S. Paolo, 10
Italy

Métallurgie et la Construction Mécanique
79, Champs-Élysées
Paris (8^{e})
France

Métaux: Corrosion-Industries
Editions Métaux
32 Rue du Marechal Joffre
St.-Germain-enLaye (Seine et Oise)
France

Microtecnic (English Ed.)
Scriptar Ltd.
23 Avenue de la Gare
Lausanne
Switzerland

Mikroskopie Zentralblatt für Mikroskopische Forschung und Methodik
Georg Fromme & Co
Wien
Austria

Mitteilungen des Chemischen Forschungsinstitutes der Wirtschaft Österreichs
Chemisches Forschungsinstitut der Wirtschaft Österreichs
Wien II
Lothringerstrasse 16
Austria

Monatshefte für Chemie und verwandte Teile anderer Wissenschaften
Springer-Verlag
Wien I
Mölkerbastei 5
Austria

N

National Luchtvaartlaboratorium
National Aeronautical Research Institute
Amsterdam
Holland

Naturwissenschaften
Springer-Verlag
Berlin W 35
Reichpietschufer 20
Germany

Nippon Kinzoku Gakkai-Si
Japan Institute of Metals
Sendai
Japan

Nucleo
Paseo de Gracia, n.^{o}11, 4^{o}, 4^{a}
Barcelona
Spain

Nuovo Cimento
Editore Nicloa Zanichelli
Bologna
Via Irnerio 34
Italy

O

Öntöde
Nehézipari Könyv- és Folyóiratkiadó Vállalat
Budapest, V., Nagy Sándor-utca 6
Hungary

P

Philips Research Reports
N. V. Philips' Gloeilampenfabrieken
Technical and Scientific Literature Dept.
Eindhoven
Netherlands

Philips Technical Review
N. V. Philips' Gloeilampenfabrieken
Technical and Scientific Literature Dept.
Eindhoven
Netherlands

Physica
Dr. W. J. Beekman
Treasurer of the Physicist Foundation
Bylhouwerstraat 6
Utrecht, Netherlands

Plastica
Uitgeversbëdrijf Reflex
Mathenesserlaan 310
Rotterdam
Holland

Prace Glownego Instytutu Metalurgii (name changed to Prace Instytutow Ministerstwa Hutnictwa)
Instytut Metalurgii
Gliwice
ul. K. Miarki 12/14
Poland

Prikladnaia Matematika i Mekhanika
Moskva, Pushkinskaia ul., Dom 23
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Priroda
Moskva, Pushkinskaia ul., Dom 23
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Pro-Metal
Association Métallurgique S.A.
Metallverband AG.
Berne
Switzerland

Promyshlennaya Energetika
Moskva, Vetoshnyi pereulok, GUM 111 Korpus, letazh, pomeschenie 164
(Moscow, U.S.S.R.)

Przemysl Chemiczny
Moskva, Pushkinskaia ul., Dom 23
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

R

Revista de Ciencia Aplicada
Alcala 95
Apartado de Correos
Madrid
Spain

Rivista dei Combustibili
Liberia Editrice Politecnica
Milano
Via Giovanni Pascoli, 55
Italy

Revue de l'Aluminium
77, Boulevard Malesherbes
Paris (VIII^{e})
France

Revue Générale des Sciences Pures et Appliquées et Bulletin de la Société Philomathique
Société d'Édition d'Enseignement Supérieur
5, Place de la Sorbonne
Paris (V^{e})
France

Revue de Metallurgie
Marcelle Bonnevialle
25, Rue de Clichy
Paris (IX^{e})
France

Revue de la Soudure
L'Institut Belge de la Soudure
Rue des Drapiers, 21
Bruxelles
Belgium

Revue Universelle des Mines, de la Métallurgie des Travaux Publics, des Sciences et des Arts Appliqués a l'Industrie
L'Association des Ingenieurs Sortis de l'École de Liége
12, Quai Paul Van Hoegaerden
Liége
Belgium

S

Schweissen und Schneiden
Friedr. Vieweg & Sohn
(20b) Braunschweig
Burgplatz 1
Germany

Schweisstechnik
Schweisstechnischen Zentralanstalt
Wien XVIII
Schumanngasse 31
Austria

Schweizer Archiv für Angewandte Wissenschaft und Technik
Buchdruckerei Vogt-Schild AG
Solothurn
Switzerland

Schweizer Druck-u. Verlagshaus AG
Zürich
Klausstr. 33
Switzerland

Science Reports of the Research Institute, Tohoku University
Tohoku University
Sendai
Japan

Sel'khozmashina
Moskva, ul. Kirova, 20
3 etazh
(Moscow, U.S.S.R.)

Smit Mededelingen
Willem Smit & Co's. Transformatorenfabriek N.V.
Nijmegen,
Netherlands

Société Chimique de France, Bulletin
28, Rue Saint-Dominique
Paris (7^{e})
France

Soudure et Techniques Connexes
Publications de la Soudure Autogéne
39, Rue d'Amsterdam
Paris (8^{e})
France

South African Mining and Engineering Journal
South African Mining Journal Syndicate Ltd.
201-207 Jubilee House
Simonds St.
Johannesburg
Union of South Africa

Spectrochimica Acta
Pergamon Press Ltd.
2, 3, and 5 Studio Place
London S.W. 1, England

Sprechsaal für Keramik: Glas: Email
Verlag Sprechsaal, Juller & Schmidt
Coburg
Mauer 2
Germany

Stahl und Eisen
Verlag Stahleisen GmbH.
Düsseldorf
Breite Strasse 27 (Schliessfach 2590)
Germany

Stanki i Instrument
Moskva 12, ul. Kuibysheva, 4, pom. 12
(Moscow, U.S.S.R.)

Steklo i Keramika
Moskva, D'iakovskii Pereulok, 4
(Moscow, U.S.S.R.)

Sulzer Technical Review
Sulzer Brothers Ltd.
Winterthur
Switzerland

Svetsaren
Elektriska Svetsningasktiebolaget
Göteborg 8,
Sweden

T

Technik
Verlag Technik GmbH.
Berlin NW 7
Unter den Linden 12
Germany

Technology Reports of the Tohoku University
Faculty of Engineering
Tohoku University
Sendai
Japan

Tecnica Italiana
Trieste
Via Beccaria 6
Italy

Tecnica Metalurgica
La Asociation Tecnica Espanola de Estudios Metalurgicos
Paseo de Gracia, 50
Barcelona,
Spain

Teknisk Ukeblad
Den Norske Ingeniorforening
Og Den Polytekniske Forening
Oslo
Norway

Tin and Its Uses
International Tin Study Group
7 Carel van Bylandtlaan
The Hague
Netherlands

TNO Niews
Fa A. H. Krugt
Goothertoginnelaan 28
Bussum
Netherlands

U

Ugol
Moskva, ul. 25^{go} Oktiabria, dom 6
Komnata 42
Ugletekhizdat
(Moscow, U.S.S.R.)

Umchau in Wissenschaft und Technik
Umschau Verlag
Frankfurt am Main
Germany

Uspekhi Fizicheskikh Nauk
Moskva, Pushkinskaia ul., Dom 23
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Uspekhi Kimii
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)
Uspekhi Matematicheskikh Nauk
Moskva, B. Kaluzhskaia Ul., 15
Gostekhizdat
(Moscow, U.S.S.R.)

V

Vestnik Akademii Nauk SSSR
Izdatel'stvo Akademii Nauk SSSR
Moskva
(Moscow, U.S.S.R.)
Vestnik Mashinostroeniia
Mashgiz, Moskva, 12
Staropanskii Nereulok, 3
(Moscow, U.S.S.R.)
Vide
Société Francaise des Ingénieurs Techniciens du Vide
44, Rue de Rennes
Paris (VI^{e})
France
Von Roll Mitteilungen
Vogt-Schild AG.
Solothurn
Switzerland

W

Werkstoffe und Korrosion
Verlag Chemie GmbH.
Weinheim/Bergstrasse
Germany

Z

Za Ekonomiiu Topliva
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)
Zapiski Vsesoiuznogo Minerologicheskogo Obshchestva
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)
Zeitschrift für Analytische Chemie
Springer-Verlag
Heidelberg,
Neuenheimer Landstrasse 24
Germany
Zeitschrift für Angewandte Physik
Springer-Verlag
Berlin W 35
Reichpietschufer 20
Germany
Zeitschrift für Anorganische und Allgemeine Chemie
Johann Abrosius Barth
Leipzig C 1
Salomonstrasse 18B
Germany
Zeitschrift für Elektrochemie Berichte der Bunsengesellschaft für Physikalische Chemie
Verlag Chemie GmbH.
Weinheim/Bergstrasse
Germany
Zeitschrift für Erzbergbau und Metallhüttenwesen
Dr. Riederer-Verlag GmbH.
Stuttgart S
Marienstr. 50
Germany
Zeitschrift für Metallkunde
Dr. Riederer-Verlag GmbH.
Stuttgart S
Marienstr. 50
Germany
Zeitschrift für Naturforschung
Verlag der Zeitschrift für Naturforschung
Tübingen
Mathildenstrasse 20
Germany
Zeitschrift für Physik
Springer-Verlag
Berlin W 35
Reichpietschufer 20
Germany
Zeitschrift für Physikalische Chemie
Akademische Verlagsgesellschaft Geest & Portig K.-G.
Leipzig C 1
Sternwartenstrasse 8
Germany
Zeitschrift für Schweisstechnik
Stauffacherquai 36
Zürich 1
Switzerland
Zeitschrift des Vereines Deutscher Ingenieure
Deutscher Ingenieur-Verlag GmbH.
Düsseldorf
Prinz-Georg-Str. 77/79
Germany

Zhurnal Fizicheskoi Khimii
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Zhurnal Obshchei Khimii
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

Zhurnal Prikladnoi Khimii
Moskva, Pushkinskaia ul., Dom 23.
Kontora "Akademkniga"
(Moscow, U.S.S.R.)

AUTHOR INDEX

Authors' names are indexed by section number and item number rather than by page. The numerals and letters preceding the hyphen refer to the section; the numerals following the hyphen refer to the number of the literature listing.

A

Abbott, L. E. 287-K
Abe, H. 17-N
Abel, E. 214-R
Aberg, Gunnar 650-E
Abrahams, Elihu 24-P
Abrahms, F. H. 705-K
Abramov, V. V. 269-J
Abramski, C. 78-B
Abreu, Alvaro De Paiva 208-B
Abrikosov, A. A. 50-P
Accles 229-F, 333-G
Achard, M. 116-M
Acharya, Y. V. G. 394-Q
Acherman, Walter L. . . . 159-R, 198-R
Achor, William 643-E
Ackerlind, C. G. 125-E
Ackerson, Cornelius 168-J
Acock, G. P. 453-R
Adachi, K. 5-P
Adair, Sam E., Jr. 896-Q
Adam, J. 14-M
Adam, L. H. 477-R
Adams, C. M. 210-Q, 472-Q
Adams, C. M. Jr. 140-E, 145-E
Adams, Edmond 6-P, 205-P
Adams, Joseph 505-Q
Adams, L. W., Jr. 182-D
Adams, Mary E. 178-R
Adcock, J. L. 341-G
Adiletta, Joseph 22-S
Adler, H. A. 224-T
Adolf, H. J. 167-K
Aeaubien, S. J. 139-G
Aebersold, Paul C. 158-S, 177-S
Afanas'ev, A. S. 536-L
Agarwala, R. P. 856-Q
Aghbabian, M. S. 739-Q
Agnew, Charles E. 104-D
Ahlert, Wilhelm 630-K
Aida, Tochio 197-Q
Aigrain, Pierre 284-P
Aiken, William S., Jr. 916-Q
Aikins, R. E. 153-D
Aitchison, Leslie 244-A, 47-C
Akimov, G. V. 125-R, 347-R, 351-R, 395-R, 448-R
Akita, Yoshio 994-Q
Albala, Americo 207-B
Albrecht, A. B. 324-G
Albrecht, Fritz 111-B
Albrecht, Gustav 362-M
Albrecht, R. 809-Q
Albright, J. C. 379-R
Albright, Stanley L. 334-T
Alden, C. R. 343-G
Alder, K. F. 93-E
Aldinger, L. A. 266-Q
Alers, George A. 223-S
Alesch, C. W. 113-J
Alexander, B. H. 2-N, 7-N, 167-Q
Alexander, T. W., Jr. 177-R
Alexopoulos, Kessar 226-M
Alfaro, R. Gil 449-K
Alico, John 126-F, 407-M
Allan, James R. 126-E
Allan, J. C. 17-B
Allard, Marc 339-D, 344-D, 371-D, 380-D
Allen, A. J. 46-P
Allen, Arthur H. . 13-F, 97-F, 247-F, 214-G, 264-J, 564-K, 36-R, 101-S, 362-S
Allen, Edward C. 219-F
Allen, J. C. 20-B
Allen, John B. 604-L
Allen, John H. 143-F
Allen, Lloyd M. 29-J
Allen, N. P. 513-Q, 99-V
Allen, W. C. 256-C
Allier, Jacques 107-T
Allten, A. G. 291-N
Almen, John O. 633-Q, 122-S
Alquist, F. N. 20-R
Alston, N. R. 157-C
Altekar, V. A. 99-N, 181-N
Altenpohl, Dietrich 110-C, 56-R, 155-R, 492-R
Altholz, Edgar 36-H
Altynov, I. P. 434-P
Alvarado, Benjamin 214-B
Ambrosino, Georges 118-S
Amburgey, L. M. 168-K
Amelinckx, S. 82-N, 927-Q
Ames, Bernard N. 608-E
Ames, D. P. 386-P

Amiot, Pierre 66-R
Anable, Wallace E. 45-C
Ananthanarayanan, N. I. 8-H
Anantharaman, T. R.278-L, 279-L, 196-M
Ancker, Betsy 305-M, 306-M
Anderko, K. 336-M, 372-M
Anders, Heinz . . . 124-H, 375-L, 732-L
Andersen, Holger C. 38-H
Andersen, J. E. 84-B
Anderson, B. H. 214-G, 345-G
Anderson, C. Travis 117-F
Anderson, E. A. 895-Q, 75-V
Anderson, Eugene F. 100-G, 84-L, 167-L, 170-L, 255-L
Anderson, J. E. 357-S
Anderson, L. E. 116-J
Anderson, N. G. 288-M
Anderson, P. W. 25-P
Anderson, R. J. 204-E
Anderson,,Robert B. 132-P
Anderson, Roger A. 987-Q
Anderson, R. V. 54-C
Anderson, Samuel W. 85-A
Anderson, T. T. 227-B
Anderson, W. E. 122-T
Andersson, Thyr 192-S
Andrade, E. N. Da C. . . . 25-Q, 1051-Q
Andreeva, A. G. 192-N
Andrews, A. H. 300-R
Andrews, A. I. 243-L
Andrews, C. W. 227-F
Andrews, Donald H. 113-P
Andrews, K. W. 8-N
Ang, Choh-Yi 215-N, 164-P
Anger, Earl M. 614-K, 619-K
Angles, R. M. 667-L, 23-R
Angus, H. T. 358-T
Annaev, R. G. 438-P
Ansbacher, F. 100-P
Anselman, George W. 531-E
Anspach, J. M. 70-S
Anstedt, Paul 370-G
Anthony, M. 28-C
Antia, Dara P. 18-A
Antoni, Jozsef 397-L
Antonic, George P. 533-E
Antonioli, Adolfo 39-D
Anuchkin, M. P. 379-Q
Aoki, Isao 54-E
Apblett, W. R. Jr. 58-Q
Apel, Heinz 90-G
Apelt, L. 263-P
Appleton C. T. . . 117-G, 150-G, 296-G
Aramburu, Marcelo G. 299-A
Araujo, Luiz Antonio de . 193-E, 181-N
Arbiter, Nathaniel. 88-V
Arbuzov, M. P. 415-M
Archibald, J. C., Jr. 92-C
Ardley, G. 315-Q, 986-Q
Arend, Heinrich 274-J, 741-L
Arens, Johann 97-J
Arkharov, V. I. .251-D, 67-M, 381-M, ... 50-N, 272-N, 317-N, 147-R
Armand, Marcel 117-M
Armiento, Dominick F. 232-J
Armour, A. M. 280-S
Armstrong, A. A. 93-J
Armstrong, D. J. 441-Q
Armstrong, Durward T. . . 50-A, 435-L
Armstrong, T. N. 13-E
Armstrong, W. H. 252-S
Arnold, B. 280-M
Arnold, Perry C. 345-K
Arnold, S. M. 101-N
Arnot, W. D. 621-E
Aronofsky, Julius 732-Q
Artamonova, E. V. 369-R
Arthur, D. F. 11-F
Arthur, J. S. 46-P
Ascik, A. L. 272-D
Asel, A. E. 126-A
Ashburn, Anderson 156-G
Ashmead, Gordon B. 77-E, 678-L
Askevold, R. J. 320-R
Aspden, H. 16-P
Assmus, F. 302-P
Atkins, E. A. 57-K, 544-K
Atkinson, R. W. 387-Q
Atterton, D. V. 171-E, 448-E, 380-P, 270-S
Attia, H. H. 626-Q
Aubertin, F. 64-M
Aubrey, Richard 187-F
Audigé, A. 123-K
Auer, Peter L. 185-N
Augustson, Richard N. 320-M
Ault, W. C. 717-L
Aust, K. T. 246-Q
Austin, A. E. 403-M
Austin, C. R. 584-E
Austin, G. W. 365-Q
Austin, John Benjamin 293-K
Austin, L. W. 227-D
Austin, W. J. 711-Q
Auwarter, M. 234-N
Avakian, S. V. 316-N
Averbach, B. L. 135-M, 271-M, 281-N, 14-P, 672-Q
Avery, D. G. 374-P
Avery, Howard S. 267-L
Avery, Richard 299-K
Avetisian, Ch. K. 31-P
Advice, Marcel 18-E
Avignon, Paul 153-P

Awetissjan, Ch. K. 159-A
Axon, H. J.. . 31-C, 37-M, 150-M, 185-M
Ayre, Robert S. 686-Q
Ayres, Charles 16-C
Aziz, P. M. 129-R
Aznar, Luis Badias 443-K
Azou, Pierre 62-Q, 85-Q
Azzam, A. M. 691-L

B

Babichev, M. A. 919-Q
Babington, W. 348-S
Babinski, W. 1045-Q
Bablik, H. 395-L, 452-L, 526-Q
Bach, B. B. 200-N
Bachmann, O. 143-T
Bachner, G. L. 51-H
Back, A. E. 44-B
Backes, Horst 277-D
Backofen, W. A. . . 99-Q, 414-Q, 976-Q
Baddeley, M. H. 352-S
Badenheuer, F. 106-D
Baeckstrom, S. 289-D
Baenziger, N. C. 295-M
Baer, H. W. 741-Q
Baerg, A. 353-P, 373-P
Baerlecken, Ewald 438-R, 119-S
Baes, C. F., Jr. 259-P
Baes, Louis 213-Q
Bagariatskii, Iu. A. 165-J
Bagchi, S. N. 177-M
Bahn, R. 377-S
Bailey, E. C. 295-K
Bailey, E. F. 77-N, 277-N
Bailey, E. T. W. 168-D
Bailey, G. C. 302-K
Bailey, G. L. J. 825-Q
Bailey, H. P. 188-A
Bailey, John M. 989-Q
Bailey, R. O. 611-L
Baillie, Yves 334-M
Bainbridge, Kenneth T. 322-P
Bainbridge, R. 57-B, 7-C
Bair, R. R. 37-L
Baird, Bruce L. 533-K
Baird, David C. 404-P
Baisch, S. J. 230-R
Baker, D. F. 287-E
Baker, G. S. 317-Q
Baker, H. Dean 684-Q
Baker, J. F. 807-Q
Baker, Lyle 329-L
Baker, M. Bryan 29-G
Baker, R. G.. . . . . 175-P
Baker, S. 303-T
Baker, S. W. 16-F
Baker, W. A. 14-C, 33-E, 571-Q
Bakshi, O. A. 953-Q
Balachandra, J. 278-L, 279-L
Balbiers, R. A. 706-L
Baldock, G. R. 69-P
Baldwin, William Marsh, Jr. . . . 36-A
Balhan, J. 250-R
Balicki, S. 1045-Q
Baliki, M. 32-F, 134-J
Balis, E. W. 132-R
Balise, Peter L. 605-Q
Balkovetz, D. S. 12-K
Ball, C. J. 565-Q
Ball, C. J. P. 39-C
Ball, F. A. 607-K
Ball, J. B. 706-K
Ball, J.G. 171-K
Ballard, W. E. 665-L
Ballay, M. 131-Q, 27-R
Ballentine, R. E. 133-K
Ballesteros, Alfredo Gonzalez . . 329-D
Ballet, M. 291-Q
Ballett, J. T. 341-Q
Ballhausen, C. . . . 2-H, 113-H, 770-Q
Ballinger, H. A. 217-S
Ballon, Alfonso 324-D
Balluffi, R. W. 2-N, 7-N, 26-N
Balmer, J. R. 307-L
Balsay, Istvan 106-V
Balyaev, A. I. 116-A
Bamber, D. D. 34-K
Ban, T. E. 169-B
Bancroft, George 94-L, 617-L
Bandel, C. G. 327-R
Bandel, Gerhard 942-Q
Bandes, H. 37-L
Banerjee, S. K. 105-B
Bangser, William 561-E
Banick, Cyril J. 276-P
Banister, Roland S. 541-E
Banks, Mason K. 55-B
Banning, Lloyd H. 45-C
Baranszky-Job, I. 242-T
Barbas, M. 108-J
Barbazanges 68-D
Barber, I. J. 605-L
Barbicane, T. P. 361-E
Barclay, F. R. 282-P
Barcoff, William 131-J
Bardeen, John 79-P
Bardin, I. P. 258-A, 283-A
Bardolle, Jean 323-M
Bardot, H. 140-T
Bardot, Marcel 163-E
Bardsley, W. 281-P
Barfield, R. H. 177-F
Bargone, Agostino 356-D

Barker, G. J. 330-S
Barker, L. B. 329-P
Barker, Lyle M. 158-B
Barkley, J. F. 485-R
Barlow, D. A. 911-Q
Barlow, Tom 443-E, 532-E
Barna, Janos 481-E, 574-E
Barnard, G. P. 294-S
Barnard, K. N. 372-R, 464-R
Barnes, H. C. 174-D
Barnes, R. S. 4-H
Barnes, W. A. 441-K
Barnett, F. R. 489-P
Barnett, James H. 16-J
Barnett, W. J. 968-Q
Barock, Charles T. 58-C
Baron, Frank . . . 11-Q, 869-Q, 1001-Q
Baroody, E. M. 75-N
Barrett, Anthony J. 248-Q, 857-Q
Barrett, Charles S. 270-M, 63-P, 285-Q, 500-Q
Barrett, J. C. 424-K
Barrett, Lou 219-K
Barrett, R. C. 37-L
Barrow, T. W. 63-T
Barrows, W. A. 96-L, 129-L
Barry, J. J. 222-K, 116-L, 138-L
Barson, F. 196-P
Bartell, F. E. 109-P
Bartfai, Ferenc 201-T
Bartholomew, E. L., Jr. . 220-A, 312-Q
Bartholomew, G. A. . .86-P, 87-P, 403-P
Bartholomew, Rosalie M. 156-P
Bartle, E. W. 173-G, 269-G
Bartlett, A. W. 422-E
Bartlett, J. H. 115-P, 10-R
Bartlett, W. L. 13-P
Barton, H. K. . . . . .53-E, 74-E, 199-E, 249-E, 390-E, . . 465-E, 154-F, 311-G, 313-G, 371-G
Barton, L. C. 362-E, 390-E
Barwell, F. T. 219-Q, 1051-Q
Bashforth, G. Reginald 226-B, 136-D, 301-D
Basinski, Z. B. 217-N
Bass, L. 120-B
Bastenaire, Francois 938-Q
Bastien, Paul . . . . . .205-N, 62-Q, ... 85-Q, 805-Q, 66-R
Batanero, J. 384-K
Batchelor, G. K. 512-P
Batdorf, S. B. 186-P, 379-P
Bates, C. C. 285-K
Bates, H. J. 163-A
Bates, J. M. 318-A
Bates, L. F. . . . . .80-H, 394-M, ... 395-M, 187-P, 417-P
Bath, Cyril J. 212-G
Batrakov, V. P. 448-R
Batta, G. 241-L
Battle, Jack L. 413-R
Batty, A. T. 114-E
Baudart, G. A. 254-A
Bauer, Charles L. 82-L
Bauer, E. 413-M
Bauer, Frances 720-Q
Bauer, G. William 82-F
Bauernfeind, Franz 397-K, 398-K
Baumeister, G. B. 76-S
Baumler, Donald F. 18-K
Baumli, E. 327-T
Baur, H. 373-M
Bawden, William D. 152-L
Baxter, C. F. 31-S
Baxter, J. P. 68-T
Bayerlein, R. W. 42-C
Bayless, Ray T. 114-A
Baylis, John R. 565-L
Baylor, B. E. 19-B
Beach, A. L. 24-N
Beach, John G. 289-K, 339-L, 340-L, 677-L
Beacham, W. 250-L
Beall, R. A. 56-C
Beam, Albert S. 338-S
Beardman, Edward L. 57-T
Beardslee, Kenneth R. 58-V
Beatson, E. V. 66-K, 248-K
Beaujard, L. 12-M, 93-M, 73-N
Beaven, H. Edgar 239-A
Beaver, H. O. 118-B, 225-D
Beaver, R. C. 137-G
Bebatty, J. 135-D
Bechaud, Leslie J., Jr. 50-B
Becht, E. F. 853-Q
Bechtold, J. H. 964-Q
Beck, A. 571-E
Beck, D. A. 2-T
Beck, F. H. 242-R, 376-R
Beck, Paul A. . . 112-N, 750-Q, 1035-Q
Beck, Richard 239-L
Becker, J. J. 257-N, 900-Q
Becker, K. 524-K
Becker, R. 501-Q
Becker, R. A. 366-P
Becker, R. C. 198-K
Becker, R. L. 183-P
Becker, W. M. 279-P
Beckert, Manfred 230-N, 1043-Q
Beckstroem, J. 129-K
Beech, A. S. 236-E
Beech, E. H. 69-E
Beedle, Lynn S. 59-Q, 484-Q, 485-Q, 588-Q

Beekhuis, D. A. 184-Q
Beeskow, H. 336-M
Begidzhanov, M. 33-A
Behr, Frederick A. 304-S
Beisswanger, H. 150-Q
Belke, William E. 34-L
Bell, Peter. 122-A, 111-G
Bell, William C. 172-B
Beller, William S. 511-Q
Belousova, E. A. 399-G
Belz, Lawrence H. 38-H
Bembibre, F. J. 506-K
Benach, M. J. 199-R
Benard, J. 27-R
Bendel, W. L. 366-P
Bender, R. S. 46-P
Bendersky, David 61-S
Benedict, T. S. 143-P
Benesovsky, F. 106-H, 144-M, 309-M, 310-M
Beneteau, Abel 222-F
Bengough, J. 293-Q
Benham, R. R. 705-L
Benitez, Fernando. 165-C
Benko, Andor 115-V
Bennek, Hubert 997-Q
Benner, H. 373-E
Bennett, Robert W. 357-K
Bennett, Russell H. 279-G
Bennett, W. C. M. 191-D
Benson, F. A. 506-L
Benson, L. E. 137-J, 244-J
Bentke, Harro 51-S
Benton, C. C. 178-D
Bentson, Harold J. 247-D
Bentz, Werner 199-S
Benz, W. G., Jr. 548-K
Beresford, L. G. 44-A
Bereuter, Rudolf O. 709-Q
Berg, Charles J. 243-E
Berg, Lavern 327-E
Berg, Siegfried 114-Q
Berg, T. G. Owe 54-R, 55-R
Bergenfelt, Sven. 42-B
Berger, M. J. 382-E
Bergeron, R. E. 245-L, 406-R
Berglund, Stig 119-N
Berglund, Torkel 12-J
Bergman, Gunnar 291-M
Bergsoe, C. 74-L
Bergson, M. A. 67-G
Berk, A. A. 189-R, 289-R, 485-R
Berkowitz, Ami E. 182-P
Bermane, D. 345-R
Bernardini, G. 319-P
Berne, E. 306-N
Berner, L. R. 175-D
Bernhard, Von. 535-L
Bernstein, F. 208-M
Berringer, J. C. 205-R, 380-R
Berry, Chester R. 450-Q
Berry, R. L. P. . . . 149-M, 253-M, 293-M
Berry, W. R. 239-T
Berryman, J. H. 237-K
Bersoux, H. 243-K
Berthold, R. 335-L, 398-S
Bertram, E. 648-E
Berwick, I. D. B. 190-R
Berzins, Talivaldis 147-L
Besnard, Maurice 255-T
Bessler, Delmar R. 160-D
Besson, Jean 110-R
Bethune, A. W. 94-C
Bett, K. E. 155-S
Betteridge, W. 78-R
Bettler, H. 63-V
Beu, Karl E. 9-M
Bever, M. B. 115-J, 228-J, 174-M, 163-P, 285-S
Bevillard, Pierre 286-P
Bevitt, E. 75-F
Beyer, E. R. 640-K
Bharucha, N. R. 431-R
Bhattacharya, U. K. 210-Q
Bianchi, G. 153-L, 328-R
Bibee, A. A. 493-Q
Bickel, E. 237-G, 346-G
Bidwell, J. B. 260-S, 402-S
Biek, L. 142-R
Bier, P. J. 267-K
Biermasz, A. L. 957-Q
Bigar, Alex, Jr. 164-D
Biggart, W. Gibson 24-K
Biggs, W. D. 64-T
Bijlaard, P. P. . . .710-Q, 712-Q, 988-Q
Bilby, B. A. 216-N
Bilfinger, Robert 496-L, 326-M
Bilhartz, H. L. 75-R
Billig, E. 287-M
Billigmann, J. 201-G
Billingsley, W. 485-L
Binder, Ira 26-H, 169-T
Binder, W. O. 416-R
Binger, W. W. 181-R, 481-R
Binns, A. 226-Q
Binstead, W. V. 196-K
Binz, A. D. 68-F
Birch, Raymond E. 189-D
Bird, David 375-D
Birchenall, C. E. . . . 193-B, 128-N, ... 158-N, 261-P, 262-P
Birdsall, George W. 360-K
Birkenshenkel, H. 426-M
Birtalan, John 231-J

Bish, G. R. 367-Q
Bish, R. E. 298-S
Bishop, C. A. 5-A
Bishop, E. 194-T
Bishop, Francis W. 180-M
Bishop, George J., III 72-L
Bishop, H. F. 285-E, 294-E, 298-E, 126-S
Bishop, J. F. W. . . 408-G, 179-Q, 1025-Q
Bishop, Leonard J. 429-E
Bishop, M. E. 144-N
Bishop, R. F. 320-Q
Bishop, Tom 249-F, 61-T
Bisson, E. E. 350-Q
Bitter, Francis 161-M
Bivens, M. E. 113-K
Black, A. J. D. 183-E
Black, Dale H. 517-Q
Black, W. A. 329-S
Black, W. W. 89-D
Blackmore, Paul O. 322-R
Blackwell, W. G. 225-G
Blade, J. C. 344-M
Blagodatskii, L. I. 200-G
Blaha, F. 124-N
Blair, T. A. 86-S
Blake, A. 310-K
Blakelock, H. D. 297-S
Blakey, F. A. 841-Q
Blanc, G. M. 300-K, 504-K
Bland, Jay 990-Q
Blanpain, E. 201-J
Blanter, M. E. 49-N, 87-N
Blaskett, K. S. 114-B, 182-B
Blasser, R. W. 215-J
Blatherwick, A. A. 873-Q
Blazey, Clement 257-F
Bleakney, H. H. 12-Q
Blean, George G. 71-D
Bleich, H. H. 425-Q, 547-Q
Bleicher, W. . . . 472-R, 149-T, 258-T
Bleton, J. 805-Q
Bleuler, E. 269-P, 270-P
Blewitt, T. H. 929-Q, 224-S
Blickwede, D. J. 363-L, 187-N
Bliesener, W. C. 341-T
Bliss, Richard 106-F, 562-L
Bloch, Peter K. 206-S
Bloom, David S. 59-M
Bloom, F. K. 356-P
Blount, Ezra A. . . 308-L, 548-L, 637-L
Blue, J. W. 270-P
Bluestone, William 352-L
Blumberg, H. S. . . 216-K, 548-K, 653-K
Blumberg, Ruth 139-B
Blunden, W. R. 147-S
Bly, Kenneth B. 593-E
Boal, George 101-F
Boam, W. 654-K
Boas, W. 315-P
Boberg, I. E. 136-N, 281-T
Bobrov, I. 461-E
Bock, Rudolph 84-C, 651-L
Bock, W. K. 148-N
Bockris, J. O'M . . . 96-B, 151-P, 316-P
Boda, Ferenc 368-R
Boecker, A. W. 239-S
Boegehold, A. L. 237-L, 59-R
Boehnke, Robert C. 598-L
Boericke, William F. 79-A
Boersch, H. 193-M
Bogachev, F. A. 739-L
Bogachev, I. N. 114-N
Bogacheva, G. N. 35-N
Bogan, L. C. 183-B, 487-E
Boggio, M. P. 331-L
Boghen, J. 376-S
Bogner, F. 298-Q
Bohner, Endre 98-H
Bohner, H. 96-C
Boiten, R. G. 125-Q, 957-Q
Boklen, R. 811-Q, 1044-Q
Boland, A. C. 513-K
Bolduc, R. 227-B
Boley, F. I. 235-P
Bolkhovitinova, E. N. 124-G
Bollinger, J. 315-K, 626-K, 43-R
Bolme, Sophur 499-L
Bolognesi, Giampaolo . . . 328-M, 378-M
Bolsover, G. R. 337-D
Bolt, Jack E. 167-E
Bolton, Michael J. 127-N
Bond, W. R. 83-B, 180-D
Bondi, A. 222-P
Bonem, Frank L. 93-L, 132-L, 380-L, 554-L, 26-R, 171-S
Bonfiglioli, G. 274-M
Bonhoeffer, K. F. 113-R, 235-R
Bonhomme, Willy 514-K
Bonilla, Charles F. 8-R
Bonnel, H. 247-T
Bonnemay, Maurice 99-L
Bonner, W. A. 192-R, 293-R
Bonnier, Etienne 125-C
Bootman, P. H. 124-C
Bordoni, P. G. 816-Q
Borelius, G. . . . 119-N, 175-N, 176-N
Borelli, F. 207-D
Boresi, Arthur P. 689-Q
Borie, B. S., Jr. 197-M
Borione, Rene 938-Q
Born, Kurt 282-F
Borovsky, I. B. 357-M
Borsoff, V. N. 91-S

Borst, L. B. 364-P
Bortner, T. E. 241-P
Boscher, J. 430-Q
Bosshard, Hans 631-K
Boston, D. C. 679-Q
Boston, O. W. 176-G
Bostrom, W. A. 172-N
Bosworth, R. C. L. 168-P
Both, Eberhard 129-J
Boting, P. G. 98-J
Bottger, O. 377-S
Boudart, G. A. 4-A
Boulger, Francis W. 158-D, 280-P, 936-Q
Bourassa, Harold 110-E, 549-E
Bourrat, Jean 91-P
Boutigny, M. 68-D, 90-E
Bowden, F. P. 1051-Q
Bowden, J. S. . . . 106-A, 249-A, 83-M
Bowen, K. W. J. 33-M
Bowerman, E. R. 473-L
Bowers, Raymond 307-P
Bowers, William F. 142-D
Bowman, Frank 171-J
Bowman, G. 112-D
Bowman, W. P. 188-F
Boyce, Carroll W. 99-S
Boyd, A. W. 251-P
Boyd, G. Murray 154-Q
Boyd, James 14-A
Boyd, John A. 327-G
Boyer, Howard E. 86-J, 303-N,
. . . . . 313-Q, 495-Q, 859-Q
Boylan, James A. 312-R
Boyle, E. J. 180-J
Boyle, Willard S. 404-P
Boynton, H. C. 169-S
Boys, S. F. 240-P
Bozorth, R. M. . . . . .
. . . . . 102-P, 116-P, 172-P, 190-P
Braca, R. M. 44-T
Brace, A. W. . . . 263-E, 368-L, 911-Q
Bradaschia, Clovis 577-E
Bradbury, Samuel 20-H
Bradfield, G. 370-Q
Bradford, C. I. 37-V, 73-V
Bradford, John R. 153-S
Bradley, Bryant W. 17-R
Bradley, D. E. 252-M
Bradley, Warren W. 370-S
Bradshaw, C. G. 381-P
Bradshaw, W. N. 223-R
Bradstreet, B. J. 698-K
Bradway, R. D. 69-K
Brady, J. R. 163-S
Braham, William E. 292-T
Braidwood, W. W. 152-A, 170-E
Brailsford, F. 381-P
Brancker, A. V. 40-F, 411-Q
Brandenberger, E. 247-A, 26-M
Brandes, E. A. . . 495-L, 663-Q, 664-Q
Brandt, F. A. 298-E, 470-Q
Brandt, Martin B. 332-E
Brandt, W. E. 150-D
Brassert, James E. 29-D
Brasunas, Anton de S. . . . 37-R, 128-R
Brater, Eric R. 3-T
Bratkova, O. N. 496-K
Brattain, Walter H. . . . 79-P, 368-P
Bratter, H. M. 66-A
Braujard, Louis 50-S
Braun, A. 389-Q
Braun, Morton A. 70-K
Braun, Winfried 122-Q
Braybon, J. E. H. 855-Q
Brayshaw, E. E. . . . . .
. . . . . 62-F, 121-F, 238-F, 266-F
Breckenridge, R. G. 273-P
Breckheimer, W. 75-P
Breden, C. R. 421-R
Breen, J. E. 975-Q
Breitfeld, H. 407-S
Breitling, G. 371-M
Bremer, Edwin 545-E, 635-E
Bremer, Gene 234-T
Bremmer, Fred H. 30-J, 51-J
Brenner, Abner 577-L
Brenner, Howard 310-L
Brenner, Morris 225-T
Brenner, P. 64-R, 237-R
Breslin, A. J. 183-K
Brett, C. W. 376-K
Breunich, T. R. 454-Q
Brewer, G. A. 597-Q
Brice, M. K. . . . 255-M, 266-P, 321-P
Brick, R. M. 405-Q, 520-Q,
. . . . . 956-Q, 969-Q, 972-Q
Bridelle, R. 227-N
Bridge, A. 233-D
Bridges, Hal 47-B
Bridgewater, M. 538-Q, 674-Q,
. . . . . 902-Q, 250-T, 273-T
Bridgman, P. W. 448-Q
Brien, Eugene B. 267-T
Briggs, Charles W. . . 217-E, 522-E,
. . . 590-E, 616-E, 638-E, 78-G, 189-Q
Briggs, G. W. D. 98-L
Briggs, H. B. 500-P
Briggs, P. R. A. 142-S, 143-S
Bright, H. A. 251-S
Bright, H. E. 184-L
Bright, J. 51-E
Brill, Edward F. 146-A
Brinberg, I. L. 590-K
Brindisi, Paul 39-R

Brinkman, J. A. 226-P
Brinkmann, R. 356-E
Brissey, Ruben M. 135-S
Brittain, J. V. 453-K
Brittingham, G. J. 93-A
Britton, O. J. 143-L, 401-R
Britton, S. C. 702-L, 23-R
Broadley, D. J. 236-F
Broberg, J. 83-E
Brockhaus, Jacques G. 139-J
Brockhouse, B. N.. 176-P, 178-P, 328-P
Brockman, F. G. 243-M
Broder, J. 143-N, 153-N
Brodovick, N. V. 494-K
Brogren, Gosta 226-M
Broh, Richard 198-A
Brokmeier, K. H. 9-C, 644-E
Brondyke, K. J. 97-B
Bronzo, Joseph 231-P
Brooke, Maxey 360-R
Brooker, Edgar 414-G
Brooker, H. R. 66-K, 248-K
Brookes, K. J. A. 906-Q
Brooks, H. 305-K
Brooks, R. D. 278-P
Brooks, S. H. 130-B
Brooks, William A., Jr. 251-Q
Brooksbank, F. 105-K
Broom, T. 500-Q
Brosch, Carlos Dias . . . 55-E, 578-E
Brosheer, Ben C. 33-F, 328-G
Brotherton, William P. 320-G, 388-G, ... 292-K, 23-T, 313-T
Brotzen, Franz R. 250-A
Brouwer, A. A. 83-L
Brouwer, R. de 457-R
Browall, H. W. 341-T
Brown, Allen A. 173-F
Brown, C. C. 156-D
Brown, Clement F. 407-K, 560-K
Brown, Darwyn I. 61-B
Brown, David P. 195-K
Brown, D. I. 98-F, 124-F, 194-K
Brown, E. F. 489-E
Brown, E. J. 268-E
Brown, F. 70-N, 11-R
Brown, Floyd 235-J
Brown, Graham B. 7-F, 78-F
Brown, H. 27-E, 444-E, 531-E, 146-G, 381-R
Brown, Harold 502-E
Brown, H. N. 366-P
Brown, N. 899-Q
Brown, Norman 205-J
Brown, R. H. 181-R, 481-R
Brown, R. J. 162-L
Brown, Robert L. 1-K
Brown, R. W. 14-L
Brown, W. F., Jr. 765-Q, 874-Q, 970-Q
Brown, Whitman E. 108-B
Brown, W. L. 124-J, 458-P
Brown, W. R. 291-R
Brownell, Kenneth C. 165-A
Browning, James S. 73-B, 104-V
Bruce, J. L. 9-B
Bruckart, W. L. 30-H, 27-V
Bruckman, K. 359-D
Bruggemann, Theo 364-G
Bruhn, R. R. 374-R
Brundell, P. O. 118-M
Brune, Fred G. 403-L
Brunn, E. 377-G
Brunner, Ray C. 561-K
Bruno, Charles 360-K
Bruno, Phillip P. 34-L
Brush, D. O. 395-Q
Brust, A. 146-E
Bryant, E. E. 459-L
Bryce, J. T. 121-J
Brylka, Gertrud 124-S
Bublik, A. I. 318-M
Buchanan, R. A. 192-D
Buchholtz, Herbert 137-F, 196-N
Buchholz, A. 393-K
Buck, Ivan 153-M
Buckeley, August 228-S
Buckingham, Earle 359-S, 395-S
Buckle, Charlotte . . 63-M, 128-M, 17-S
Buckley, F. 248-E, 297-T
Budiansky, Bernard 253-Q, 730-Q
Budner, A. E. 132-G
Budnikov, P 279-D
Buehl, R. C. . . . 120-A, 6-B, 12-D, ... 158-D, 186-D, 320-D
Buell, William C., Jr. 338-D
Bufe, Werner 151-T
Buffum, D. C. 265-J, 671-Q, 891-Q, 980-Q
Buford, Wiley C. 141-D
Bugas, John S. 69-A
Buhler, Hans. . 494-R, 116-Q, 118-Q, ... 143-Q, 149-Q, 240-Q, 433-Q
Buinov, N. N. 918-Q
Bukowiecki, A. 211-R
Bukowsky, H. E. 397-R
Bulle, G. 238-D, 315-D, 327-D
Bullen, F. P. 258-Q
Bulliard, Hubert 284-P
Bullock, R. J. 21-F
Bunce, Bernard E. 595-L
Bundy, Richard D. 138-D
Bungardt, Karl 80-J, 30-Q, 149-R
Bungardt, W. 285-T, 291-T
Bunge, Gerhard 487-Q

Bungeroth, A. 96-D
Bunker, M. E. 386-P
Bunn, William B. . . . 8-S, 37-S, 309-S
Bunshah, R. F. 258-N
Bunyan, T. W. 626-Q
Burbank, J. B. 51-R
Burbank, Jeanne 42-M
Burdick, L. R. 485-R
Burdsall, Richard L. 9-J
Burgers, W. G. 92-N
Burgess, Charles O. 215-E, 542-E, 264-S
Burgess, H. D. 706-L
Burghoff, H. L. 877-Q
Burgt, C. M. van der 330-P
Burkart, W. 234-G, 291-G, 418-G, 456-L
Burke, J. E. 87-T
Burmeister, Hans 89-H
Burnett, H. C. 907-Q
Burnham, H. D. 192-R, 293-R
Burns, J. R. 198-E
Burns, J. W. 161-Q
Burns, Robert L. 197-B
Burr, A. C. 162-R
Burr, Arthur A. 146-L
Burr, Irving W. 405-S
Burrier, G. M. 241-D
Burrill, E. Alfred 29-S
Burstall, F. H. 281-A
Burt, Fred M. 109-G, 157-K, 239-K, 339-K, 599-K, 86-L, 231-L, 643-L, 300-S
Burton, C. A. 5-K
Burton, H. 12-S
Burton, H. H. 77-F
Burwell, J. T. 225-Q, 352-Q
Busby, G. E. 6-L
Busby, Paul E. 961-Q
Busby, W. 299-E
Busch, D. A. 77-C
Busch, Lee S. 53-J
Buschmann, S. 12-T
Bush, S. H. 70-Q
Bushe, N. A. 648-Q
Bushell, R. 187-K, 678-K
Bushnell, R. S. 196-E
Busse, F. 127-K
Bussy, Pierre 721-L, 302-M
Buteux, R. H. 254-M
Butler, Clarence H. 564-E
Butler, P. L. 48-E
Butlin, K. R. 454-R
Butra, F. P. 67-M
Buttner, F. H. 84-P
Buttrey, D. N. 31-E, 426-E, 538-E, 539-E
Butuzov, V. P. 511-P
Buxton, W. J. 351-T
Buzzard, R. W. 122-M, 251-M
Byers, J. F. 148-F
Byrkit, James W. 78-C
Byrne, Joseph 306-R
Byrns, H. A. 183-D
Bystram, M. C. T. 612-K
Bzdula, A. J. 385-E

C

Cabarat, R. 268-N
Cabble, George M., Jr. . . . 509-L, 140-Q
Cabrera, N. 235-M
Cadenhead, A. F. 141-A, 151-A
Cadoff, Irving 79-M
Cage, J. F., Jr. 206-A
Cahn, R. W. 238-M, 109-N, 286-Q, 319-Q
Cain, F. M., Jr. 222-M
Cain, Georges 183-J
Caine, J. B. 102-E, 112-E, 289-E, 476-Q
Cairns, W. J. 326-Q
Calais, Rene 255-T
Calamari, P. L. 319-G
Calaque, Raimond 376-D
Caldas, A. 165-S
Calderon, Albert 166-D
Caldwell, J. A. 193-R, 259-R
Caldwell, J. B. 3-Q
Caldwell, M. R. 496-E
Calking, G. D. 158-S
Callaway, Joseph 89-M
Calmes, C. 71-F
Calnan, E. A. 136-R
Calvet, Jean 63-M, 251-N
Cameron, A. G. W. 174-P
Cameron, D. I. 218-T
Cameron, J. 119-J, 119-T
Camolese, Guido 65-D, 207-D
Campbell, D. K. 51-B
Campbell, F. G. 181-K
Campbell, I. A. 13-G
Campbell, I. E. 89-C
Campbell, J. D. 94-Q
Campbell, John B. 285-L, 527-L
Campbell, R. 109-H
Campbell, R. F. 358-S
Campbell, W. R. 586-Q
Campos, Geir 162-B
Campus, F. 511-K, 235-Q
Canard, R. 614-Q
Canguilhem, Hector 340-D
Cannon, H. S. 84-H
Cannon, James A. 242-E
Cannon, William A., Jr. 208-S
Canzler, Heinrich 48-L
Caplan, D. 375-R, 296-S
Caplan, Robert 68-H

Capua, Tony 304-L
Card, Harold S. 332-K, 335-K
Cardew, John 128-D
Carlberg, Bo Casten 435-E
Carli, Felice De 265-D
Carlson, A. E. 37-L
Carlson, I. H. 295-K
Carlson, Ralph 506-E
Carlson, R. G. 141-E, 966-Q
Carlson, Robert A. 407-L
Carlsson, Olof . . . 8-E, 436-E, 625-E
Carlvik, Ingvar 210-P
Carman, C. MacArthur . . 142-B, 232-J
Carmichael, D. C. 48-A
Carmichael, E. S. 14-T
Carmody, W. R. 13-B
Carney, D. J. 67-B, 230-J,
. . . . . 283-M, 147-N, 161-S
Caron, Michel 288-P
Carpenter, Dan H. 86-R
Carpenter, E. A. 251-L
Carpenter, R. P. 177-D
Carr, Dodd S. 8-R
Carr, F. L. 671-Q, 891-Q
Carreker, R. P., Jr. 404-Q
Carroll, J. B. 75-F, 638-K
Carroll, K. G. 132-N
Carruthers, M. E. 65-V
Carse, J. B. 132-G
Carson, O. A. 126-Q
Carter, Fred M. 182-F
Carter, George M., Jr. 414-L
Carter, P. T. . . . . .
. . . . . 231-D, 260-D, 291-D, 308-D
Carter, R. D. 366-Q
Carter, Sam F. 129-E, 506-E
Cartwright, W. F. 220-D
Carwile, Nesbit L. 165-Q
Casadio, M. 271-N
Case, E. N. 266-J
Case, J. M. 37-G
Case, John S. 156-L
Case, Samuel L. 152-B, 560-L
Casey, E. J. 245-L, 406-R, 36-T
Cass, Robert 223-T
Cassels, C. S. 96-A
Castelliz, L. 428-M, 94-N
Castro, Rene 159-Q
Caswell, J. S. 312-A
Cataldi, H. A. 320-R
Cate, W. Ten 125-Q
Cates, Louis S. 164-A
Cates, Walter H. 159-L
Cattaneo, A. G. 139-G
Cattier, P. 157-Q, 805-Q
Cattoir, Francis R. 117-F
Caule, E. J. 218-L
Cavanagh, J. O. 642-J, 680-K
Cavanagh, P. E. 114-D, 331-D
Cayci, M. A. 139-Q
Cazaud, R. . . . 115-A, 119-Q, 148-Q,
. . . . . 190-Q, 274-Q, 806-Q
Cech, R. E. 131-N
Cech, Robert A. 585-E
Cellan-Jones, Gwynne 190-B
Ceresa, Myron 409-L
Chaadaeva, M. S. 242-N
Chadwick, J. D. 537-K
Chakrabarti, N. G. 115-E
Chalmers, B. 39-N, 40-N, 203-N,
. . . . . 220-N, 278-N, 398-P, 876-Q
Chamberlain, L. E. 221-T
Chamberland, H. J. 299-G
Chambers, B. H. 256-K
Chambers, D. S. 285-N
Chambers, R. G. 1051-Q
Chambers, S. D. 188-Q
Chambers, T. N. 92-G
Champion, D. F. W. 18-H
Chandrasekharan, V. 12-P
Chang, C. H. 318-P
Chang, Che-Tyan 745-Q
Chang, Hsing C. 171-Q, 893-Q
Chang, John Chuan 967-Q
Chang, Lo-Ching 1031-Q
Chang, W. H. 91-M
Changarnier, Christiane . 63-M, 251-N
Chant, P. 101-J
Chantler, S. W. 202-J
Chapman, F. H. 143-C
Chapman, J. C. 537-Q
Chapman, R. D. 207-J
Chappuis, Jacques A. 410-G
Char, T. L. Rama 277-L
Charity, Frank . . . 19-G, 362-L, 46-S
Charles, W. D. 99-P
Charlesby, A. . . . . .
. . . . . 238-P, 332-P, 333-P, 415-P
Charlesworth, P. A. 640-L
Charlton, J. R. . . . 488-E, 607-E, 153-K
Chase, George A. 135-S
Chase, Herbert . . . . . .
. 142-A, 227-E, 595-E, 63-F, 106-G,
. . . 369-G, 1-J, 96-J, 107-J, 604-K,
. . . .676-K, 163-L, 572-L, 606-L, 9-S
Chaston, J. C, . . . 704-K, 5-M, 210-R
Chatterjee, Santimay 453-P
Chaudhuri, Arup 166-Q, 406-Q
Chaudron, Georges . . . . . .
. . . . . 302-M, 244-N, 91-P, 27-R
Chauvin, Gabriel 254-E
Chawla, J. P. 721-Q
Chebotarev, N. T. 68-M
Chelishchev, E. V. 105-D

Chelnokov, N. M. 493-K
Chemla, Marius 184-S
Chen, N. K. 170-Q, 890-Q
Chenault, R. L. 105-J
Cheng, L. S. 365-P
Chernovol, S. E. 325-K
Cherry, Arnold K. 326-R
Chesnut, Frank T.. 147-C, 254-F, 225-J
Chessick, J. J. 110-P
Chester, A. E. 37-L
Chesters, J. H. 83-D
Chesters, W. T. 844-Q
Chevrier, Andre 244-T
Chiaverini, Vicente 119-H
Child, H. C. 646-Q, 846-Q
Childers, Howard D. 18-L
Childs, B. G. 482-P
Chilver, A. H. 842-Q
Chipman, John . . . . . .
. . . . . 154-B, 171-B, 184-B, 74-D,
. . . . 309-D, 56-N, 43-P, 410-P, 60-S
Chivers, A. B. L. 471-L
Chohen, Bernard L. 387-P
Choquet, A. 53-C
Chow, J. G. Y. 291-N
Chowdary, S. A. 270-P
Christensen, L. M. 158-F
Christenson, A. L. 231-J
Christian, J. W. . . 25-M, 196-M, 217-N
Christian, R. S. 512-P
Christianson, H. B. 181-K
Christie, G. L. 372-R
Christopher, G. C. 198-K
Chu, Chen 700-Q, 701-Q
Chuchmarev, S. K. 451-P
Chufarov, G. I. 251-D
Chung, S. Y. 98-G
Church, F. L. 153-A, 191-T
Churchill, S. C. . . . 221-Q, 47-T, 90-V
Churchman, A. T. 170-M, 319-M, 1029-Q
Chyle, J. J. 170-K, 477-K, 77-S
Cibula, A. 23-N
Cina, B. 171-N
Clabaugh, W. J. 454-P
Claffey, James D. 100-E
Claisse, F. 53-C
Clapp, C. W. 73-S
Clarebrough, L. M. 138-Q, 917-Q
Clark, C. A. 189-P
Clark, C. L. 290-N, 654-Q
Clark, D. S. 749-Q, 865-Q
Clark, F. H. 2-H, 85-H
Clark, Hale A. 12-E
Clark, J. G. 60-K
Clark, J. R. 35-M
Clark, J. W. 717-Q
Clark, Kenneth H. J. 364-T
Clark, Ralph A. 299-D
Clarke, Edward N. 460-P
Clarke, Harry F. 181-G
Clarke, J. S. 144-R
Clarke, S. G. 223-R
Clarke, W. B. 91-T
Clarke, W. E. 176-S
Clarke, W. W. H. 165-M
Clas, G. 410-E
Clasing, M. 44-H, 112-J
Clason, Clyde B. 199-K, 420-K
Clauser, H. R. 26-K, 44-V
Claussen, G. E. 271-Q
Clawson, B. W. 75-S
Claypoole, W. 684-Q
Clayton, W. J. 592-K
Clegg, P. L. 374-P
Clements, J. F. 570-L
Clements, R. 192-K
Clemmons, B. H. 202-B, 104-V
Clevenger, Clinton B. 73-B
Clews, C. J. B. 136-R
Cliett, Charles B. 34-Q, 863-Q
Clift, A. 22-L, 6-T
Cloninger, Kriss, Jr. 1011-Q
Close, Gilbert C. 65-E, 623-E, 267-F,
. . . . .116-G, 138-G, 274-G, 339-G,
. . . . .23-J, 501-L, 15-S, 100-S, 69-T
Clough, W. R. 609-Q
Clusius, Klaus 337-P
Cobb, L. D. 108-T
Cochardt, A. W. 548-Q
Cochran, D. R. 300-D
Cockcroft, John 393-S
Cockett, G. H. 117-H
Cocubinsky, J. 187-D
Code, C. J. 83-S, 85-S
Codelli, H. A. 128-J
Coe, John S. 301-K
Coenen, F. L. 65-F, 386-G
Coffin, Frances Dunkle 299-Q
Coffman, F. B. 162-S
Cohen, Hans Michael 110-C
Cohen, Karl 137-T
Cohen, Morris . . . . . .
. . . . .218-L, 281-N, 284-N, 309-N,
. . . 14-P, 672-Q, 11-R, 194-R, 375-R
Coheur, P. 335-D
Colbeck, E. W. . . . 1006-Q, 257-S, 2-V
Colding, B. 231-Q
Cole, D. G. 253-N, 302-N
Cole, G. H. 242-P
Cole, H. G. 156-C
Cole, J. H. 75-K
Cole, R. E. 87-B
Colegate, G. T. 2-L, 62-L,
. . . . . 186-L, 259-L, 206-R

Coleman, George W. 337-T
Coleman, Walter W. 586-E
Coleman, William E. 157-R
Coles, B. R. 361-M
Collari, Nello 378-Q, 815-Q
Collaud, Albert 238-Q, 85-T
Collen, Torsten 16-D
Collette, Gaston 190-M, 73-N
Collins, J. F. 212-K
Colon, Herman 222-L
Colton, R. A. 69-N
Colville, George 60-B
Colwell, A. W. 583-Q
Colwell, Donald L. 29-E
Colwell, L. V. 221-G
Compton, K. G. 404-R
Compton, Vera B. 88-A
Comstock, G. J. 2-H, 85-H
Conacher, H. J. M. 273-E
Colan, Richard B. 600-L
Conley, L. L. 160-N
Conn, C. W. 137-A
Connick, Robert E. 36-P
Connington, M. J. 168-G
Connor, T. J. 472-L, 629-L
Conrad, G. P. II, ... 672-Q
Conrad, M. 243-K
Conrad, R. W. 591-Q
Conradi, J. J. 293-R
Constantine, L. R. 85-K
Contractor, G. P. 149-B
Converse, C. J. 350-E
Conway, B. E. 11-C
Conway, H. D. 423-Q, 424-Q
Conway, H. G. 264-F
Conwell, E. M. 361-P
Cook, C. Sharp 265-P, 318-P
Cook, Harry C. 572-K, 655-K
Cook, L. G. 310-N, 311-N, 372-P
Cook, Maurice 48-C
Cook, Paul M. 158-S
Cooke, Strathmore R. B. 22-B
Coombes, G. 477-Q
Cooper, John N. 19-C
Cope, Howard 228-E
Cope, R. R. 173-T
Cope, Stanley R. 262-G, 326-G, 329-G, 400-G
Copley, J. S. 251-T
Copson, H. R. 96-R, 241-R
Corbett, P. F. 221-R
Cordero, H. G. 134-A, 26-D
Cordner, G. D. 26-C
Corey, H. E. 179-M
Corfield, R. J. 63-B
Coriolis, E. G. de 10-F
Cork, J. M. 266-P, 321-P
Cork, M. 255-M
Corliss, L. 35-M
Correa da Silva, Luiz C. 111-V
Corrigan, Brian 30-R
Cortelyou, W. H. 387-Q
Corten, H. T. 398-Q, 399-Q
Cory, Charles R. 230-G
Cosslett, V. E. 23-M, 199-M
Cota, A. F. 77-S
Cottrell, A. H. 4-N, 52-Q, 381-Q, 925-Q, 986-Q
Cottrell, C. L. M. . 331-K, 698-K, 104-Q
Cottrell, S. A. 5-N, 80-N
Couch, Dwight E. 577-L
Couchet, Georges 59-P
Coudray, Raymond 266-N
Coughlin, V. L. 93-G, 107-G
Coulson, C. A. 34-P
Coulter, Warren 455-K
Courard, T. 516-K
Cousans, F. 262-E
Cousteau, Jacques-Yves 254-T
Covert, Arthur S. 40-L
Covington, G. A. 618-K
Cowan, A. 462-E, 610-E, 881-Q
Cowdrey, Irving H. 220-A
Cowley, C. L. M. 48-C
Cowley, J. M. 289-M
Cox, D. R. 333-Q, 334-Q, 335-Q, 342-Q
Cox, H. L. 194-Q, 930-Q
Cox, I. D. 47-A
Coxon, W. F. 327-L
Coyet, G. 174-B
Crabtree, E. H. 54-B
Crafts, Walter 197-D, 22-M
Craggs, J. W. 555-Q
Crahen, Frank 240-J
Craighead, C. M. 30-H, 8-M
Craine, S. D. 885-Q
Cramer, R. E. 84-S, 89-S
Crane, E. V. 224-G
Crane, Henry D. 92-R
Crase, G. H., Jr. 205-T, 207-T
Crasemann, Bernd 369-P
Crawford, Alan E. 16-L, 128-S
Crawford, T. J. 675-K
Crede, J. H. 129-J
Creedle, F. W. 181-K
Cremer, E. 91-H
Cresswell, J. D. 40-S
Creutz, E. 42-F
Crewdson, E. 91-R
Cripps, A. J. 145-A
Crites, G. Jewett 95-C
Crittenden, E. C., Jr. 206-P
Crockard, Francis H. 65-B
Crocker, Sabin 265-T, 296-T

Croft, A. J. 141-P
Croft, P. J. 231-T
Croisant, H. W. 209-K
Cronemeyer, D. C. 245-P
Crook, A. W. 105-Q
Crosby, E. H. 174-P
Cross, A. Stanley, Jr. 147-K
Cross, H. C. . . . 28-K, 24-M, 1007-Q
Crowther, F. 73-C
Croxford, C. 27-D
Crum, F. J. 319-G
Crussard, C. 64-M, 32-N,
. . . . . 145-N, 152-P, 261-Q
Csonka, P. 759-Q
Cubicciotti, Daniel 472-P, 222-R
Cubitt-Smith, Guy 73-K
Cueilleron, Jean 13-H
Cuff, Frank B. 62-M, 6-Q
Cullen, G. V. 246-E
Cullen, O. E. 196-J
Cullity, B. D. . . . 198-M, 419-M, 152-P
Culmann, J. 645-Q
Cundall, K. N. 1-L
Cunningham, C. B. 587-Q
Cunningham, J. W. 655-K
Curie, E. M. 261-E
Curll, V. A. 34-L
Curlook, W. 209-M
Curphey, J. S. 294-D
Currey, Norman S. 379-G
Curry, D. R. 61-L
Curry, Robert W. 255-P
Curry, Thomas W. 384-S
Curtis, Michael C. 231-S
Cushing, R. L. 310-N, 311-N
Cuskie, Walter 453-E
Custer, J. D. 56-B
Cuthbert, E. 611-K
Cuthbertson, J. W. 15-C, 18-C, 172-G,
. . 168-L, 575-L, 667-L, 83-M, 344-M
Cutting, Theodore A. 125-S
Czegi, Jozsef 948-Q

D

Daane, A. H. 81-C, 155-C
Dabala, M. 132-C
Dacey, G. C. 359-P
Dacves, Karl 382-D
Dadswell, C. J. 620-Q
Dague, J. O. . . . 152-D, 242-D, 103-F
Daguet, Rene 316-T
Dahl, O. 48-N
Dahl, T. 61-F
Daleney, J. B. 38-S
Dallemagne, G. 241-L
Dallison, K. J. 280-Q
Dallmeyer, G. 363-R
Dalton, R. F. 128-E, 171-T
Dalziel, H. R. 20-M, 140-R
Danhier, F. 214-K, 515-K
Daniel, C. 682-Q
Daniel, H. 505-P
Daniel, S. G. 67-Q
Daniels, Farrington 295-S
Daniels, W. C. 269-D
Dannatt, C. W. 145-C
Dannohl, Walter 303-P
D'Ans, Jean 75-P
Danysz, M. 243-P
D'Appolonia, E. 696-Q
Darcy, G. A. 207-S
Dargent, R. 424-M
Darken, Lawrence S. 255-P
Darling, A. S. 5-M
Darling, H. E. 125-T
Darmann, Hans Jurgen . . 15-D, 206-D
Darmara, F. N. 78-H
Darmois, Eugene 719-L
Darnell, A. J. 54-N
Das Gupta, S. C. 115-N
da Silva, Luiz C. Correa 111-V
Datsko, Joseph 176-G
Daugherty, J. 154-G
Daunt, J. G. . .23-P, 26-P, 103-P, 479-P
Daurat, J. . 233-G, 288-G, 361-G, 376-G
Dautzenberg, Wilhelm 21-C
Dauvergne, M. 290-S
Davey, John S. 425-K
Davey, T. R. A. 123-C
David, Jean-Pierre 446-P
Davidson, J. Dean 620-K
Davidson, J. F. 560-Q
Davidson, S. 517-E
Davies, A. E. 667-L
Davies, E. Brett 495-E, 609-E
Davies, Max 82-D
Davies, M. H. 193-B, 156-M
Davies, R. M. 393-Q
Davis, Carl R. 218-R, 262-R
Davis, Edwin 647-K
Davis, E. F. 266-K
Davis, F. T. 179-B
Davis, Harold 208-T
Davis, H. M. 53-P
Davis, John V. 34-L
Davis, M. C. 23-L
Davis, Nathanael V. 234-A
Davis, W., Jr. 160-N
Davison, D. W. 1-M
Davison, M. J. 177-E
Davy, N. 295-P
Dawihl, Walther 15-H, 192-M
Dawson, I. M. 232-M, 288-M

Dawson, J. V. 200-N
Day, Emmett E. 375-Q
Day, H. L. 338-T
Day, Robert E. 563-E
Daybell, E. 359-E
Deacon, Wilfred 31-T
Deal, W. E. 81-P
Dean, W. R. 345-Q
de Araujo, Luiz Antonio . . 193-E, 181-N
De Beaulieu, Christian 244-N
Debenham, H. G. W. 364-D
Debenham, W. S. 288-D
de Brouwer, R. 457-R
DeCarli, Felice 265-D
DeCecco, N. A. 596-K
Decherf, Edouard 358-D
Decker, B. F. 535-Q
Decroly, C. 153-C
DeCrop, Maurice . 123-E, 253-E, 455-E
Dedieu, Jacques 205-N
deFleury, R. 647-Q
Defranoux, J. M. 109-R
de Gier, J. 227-T
Deglon, B. H. 300-K, 504-K
de Graaf, J. E. 379-D, 164-Q
Degreef, V. 147-Q
De Greve, L. 297-P
DeGroat, George H. 34-S
Degros, Marc F. 89-E
Dehlinger, U. . . . . .
. . . . . 314-N, 167-P, 510-Q, 766-Q
Dehn, George L. C. 340-S
Dehne, Willi 202-D
Deily, R. L. 253-F
Deisenroth, R. J. 221-L, 699-L
Deissler, R. G. 126-H
Deitz, G. A. 473-P
de Izuzquiza, Mariano . . 131-K, 380-S
de Jager, W. G. R. . . 444-P, 524-Q,
. . . . . 47-V, 92-V, 129-V
De Jongh, M. A. 219-J, 241-J
Dekhtyar, I. 193-N, 260-N
de Klerk, D. 94-P
De Kok, S. K. 137-B
Delahay, Paul 147-L, 10-P
Delaney, John 230-F
DeLazaro, D. J. 960-Q
Delbart, G. 47-J, 386-K
de Leiris, H. 112-Q, 291-Q,
. . . . . 355-Q, 996-Q, 319-S
Delfs, J. M. 154-G
Delhey, W. F. 142-E
Delisle, Laurence 172-M
Dell, R. M. 128-P
Delmas, Roger 530-L
Delong 274-D
De Long, H. K. 211-L, 306-L
DeLong, Louis F. 68-L
DeLonge, Kenneth A. 952-Q
de Marneffe, P. 519-K
Demarteau 274-D
Demichelis, Francesca 310-S
de Moraes, Jose Ermirio 257-A
de Moraes, Luciano Jacques . . . 161-B
Denbigh, K. G. 33-P
Dengler, M. A. 692-Q
Den Hartog, J. P. 468-Q
Denison, Irving A. 24-R, 25-R
Dennehy, M. J. 137-B
Dennery, Charles 599-E
Dennis, W. E. 127-P
Dennis, W. H. 101-V
Dennis, William A. 367-D
Dennison, D. H. 81-C
Dennison, J. P. 201-N, 63-R
Denny, L. R. 108-F
Dent, J. H. 467-K
De Paiva Abreu, Alvaro 208-B
De Pastina, Richard 88-L, 414-L
Derby, R. A. 81-B
Deresiewicz, H. 694-Q
Deriagina, O. G. 347-R
deRidder, E. J. 282-Q
Deringer, W. A. 694-L
Derlon, H. 572-E
De Rop, Camille 662-K, 704-K
Deruyttere, A. E. 854-Q
Desbriere, Georges 24-B
Deschamps, Yvon 153-P
De-Shalit, A. 388-P
Desiatkov, M. D. 785-Q
de Smet, Gerard 194-J
DeSorbo, W. 223-N, 83-P,
. . . . . 277-P, 406-P, 509-P
de Souza Santos, Tharcisio D. . . . .
. . . . . 130-C, 164-C, 176-C, 177-C
De Sy, Albert 633-E
Dettner, Heinz W. . . . 387-L, 455-L,
. . . . . 648-L, 737-L, 741-L
Deuber, Carl G. 116-R, 131-R
DeVaney, Fred D. 21-B
Devilder, P. 69-B, 318-S
Devoluy, R. P. 45-R
deWet, J. P. 631-E
Dews, J. W. 315-E
Dexter, D. L. 242-M
D'Eye, R. W. M. 281-M
d'Herbemont, G. 189-K
Diaz, J. B. 699-Q
Diaz, Rafael 176-L, 47-S
Dick, James G. 11-E, 34-E
Dick, John N. 56-T
Dick, Walther 947-Q
Dickenscheid, Werner 178-N

Dickie, E. R. 60-B
Dickinson, G. H. 212-J
Dickinson, T. A. 85-G, 170-G, 231-G, 382-G, 95-K, 529-K, 535-K, 307-S, 339-S, 351-S
Dickinson, Robert 82-F, 464-L
Dickson, R. W. 73-F
Didier, Heinz 69-F
Diebold, John 58-A
Diehl, Charles 548-K
Dienes, G. J. 42-N, 115-P, 542-Q
Diercks, Hans 229-A
Dierdorf, Claude C. 34-J
Dieter, G. E. 1027-Q
Dieter, W. E. 132-P
Dieterly, D. C. 51-T
Dietert, Harry W. 297-E, 446-E
Dietrich, Hermann 96-N
Dietzel, A. 147-E
Digges, Thomas G. 213-J
Diggin, Myron G. 36-L, 39-L
Diiakonov, A. 51-N
Dijkstra, L. J. 43-M, 199-P
Dike, Kenneth C. 250-N, 306-Q
Dill, F. H. 410-K
Dill, Gilbert D. 725-L
Dill, H. C. 267-S
Dilley, D. C. 231-K
Dilling, E. Don 105-C
Dillworth, Edmund 228-A
Dimaggio, F. 635-Q
Dingle, R. B. . . . 89-P, 401-P, 441-P
Dion, G. H. 217-P
Diran, L. M. 130-E
Discher, C. A. 52-P
Di Sylvestro, G. 204-Q
Ditl, Josef 622-K
Ditmars, Walter E. 310-P
Di Vincenzo, A. P. 134-G
Dixon, C. E. 226-P
Dixon, D. 173-B
Dixon, H. E. 77-K, 290-K, 291-K, 328-K, 1028-Q
Dixon, L. A. 908-Q
Dixon, M. C. 196-E
Djingheuzian, L. E. 4-B
Dmitriev, P. T. 275-K
Doan, Gilbert E. 63-A
Dobbrodt, A. F. 79-H
Dobos, Gyorgy 167-B
Dobretsov, L. N. 522-L
Dodd, J. 14-K
Dodd, R. A. 199-B
Dodge, Barnett F. 56-A, 412-L
Dodson, D. A. 378-E, 440-E
Doelker, William J. 73-H
Doerner, H. A. 85-B
Doggett, L. W. 298-R
Dohrmann, Robert R. 592-E
Doig, J. R. 385-M
Dolan, T. J. 618-Q, 746-Q, 866-Q, 867-Q
Dolby, J. L. 376-Q
Domagala, R. F. 44-M, 73-M
Domony, Andras 397-L, 367-R
Donaldson, V. V. 225-M
Donnelly, Irene 618-L
Donnelly, W. L. 382-L
Donoho, C. K. 212-Q
Dorenfeld, Adrian C. . . . 104-B, 179-B
Dorey, S. F. 34-R
Dorn, J. E. . 85-N, 173-Q, 977-Q, 978-Q
Dorre, E. 336-M
Dörrscheidt, W. 396-K
Doss, Jodie 63-L, 543-L
Dotson, C. L. 287-N
Doty, W. D'Orville 637-K
Doucet, M. 297-N
Doucet, Y. 119-C
Dougherty, Robert 429-L
Douglass, D. 387-R
Douty, Alfred 485-L
Dovey, D. M. 56-J, 1051-Q
Dovgalevskii, Ia. M. 395-P
Dow, Norris F. . . 606-K, 730-Q, 158-T
Dow, R. 621-L
Dowd, J. J. 287-M, 43-N
Downie, C. C. 164-B, 27-C, 64-C, 102-C, 169-C, 81-L
Downing, R. C. 313-R
Doyle, Edwin F. 349-L
Drachmann, Jorgen 486-E
Dravnieks, Andrew 134-R
Drechsler, M. 294-P
Dreher, G. M. 107-A
Dreher, Manfrid 41-M
Dreves, Ford E. 1004-Q
Drew, Denis A. 593-Q
Drewes, C. H. 519-E
Dreyer, K. L. 204-M, 48-N
Drouard, R. 256-N
Drucker, D. C. 244-Q, 606-Q, 727-Q, 733-Q
Drumm, Manuel F. 292-E
Dube, C. A. 167-Q
Dubinin, G. N. 52-M, 36-N, 78-N
Dublo, A. J. 58-E
Dubois, Ch. 805-Q
Dubpernell, George 37-L, 174-L
Dubpernell, Roberta 174-L
Duddle, R. S. 120-G
Dueber, Carl G. 156-R
Duffy, E. J. 66-S
Duflot, J. 32-N, 295-N, 27-R
Dugdale, J. S. 114-P

Dugdale, R. A. 14-M
Duhmke, M. 321-S
Dulis, E. J. 132-N, 288-N
Dulovic, M. 123-B
Dummett, W. M. 114-E
DuMond, R. C. 19-L
DuMond, T. C. 365-G, 48-T
Dumoulin, L. 124-K
Dunavan, D. S. 235-P
Dunbar, S. R. 895-Q
Dundon, William E. 614-K, 619-K
Dunham, C. W. 19-B
Dunkin, H. H. 8-B, 114-B, 165-B
Dunn, C. G. 10-M, 108-N
Dunn, Walter H. 563-E
Dunphy, R. P. 82-S
Dunsmuir, Pamela 56-M
Durelli, A. J. 516-Q, 582-Q, 704-Q, 48-S
Durfee, Walter W. 221-D
During, W. J. 505-E
Durkin, A. E. 675-L, 394-R
Durnan, J. J. 81-G, 254-G
DuRose, A. H. 365-L
Dürr, W. 216-P
Durrell, W. H. 2-B
Durrer, R. 220-B, 321-D
Durtschi, Richard E. 89-C
Duwez, Pol 80-M, 71-N
Duyn, G. C. 829-Q, 995-Q
Dvorak, H. R. 324-P
Dyer, Hugh N. 25-G
Dyke, Ray A., Jr. 212-Q
Dyke, R. H. 94-E

E

Eade, R. W. 35-V
Eagan, T. E. 89-T
Eastwood, L. W. 147-N
Eaton, S. E. 65-L
Ebeling, Dolph G. 146-M, 388-M
Ebner, Kurt 300-N
Eborall, R. 622-Q, 667-Q, 317-R
Eckart, O. 372-E
Eckel, Earl J. 190-J
Economos, George 93-R
Eddins, M. W. 17-K
Edeleanu, C. 122-R
Edelman, F. 728-Q
Edelman, R. E. 471-Q
Edel'son, A. M. 521-L
Eden, J. J. 311-Q
Edlund, Herbert 374-G
Edmondson, B. 224-N
Edmunds, W. T. 491-Q
Edwards, A. R. 165-D
Edwards, E. H. 110-N
Edwards, J. 423-L, 525-L, 666-L
Edwards, James W. 310-P
Edwards, Junius D. 5-C, 60-T
Edwards, R. 236-N
Edwards, W. A. 573-L
Eeles, E. G. 149-N
Efimov, N. V. 467-Q
Efremova, K. A. 272-N
Eger, Edward C. 140-S
Eggleston, R. R. 78-Q
Ehrhardt, Rudolf 348-D
Ehrsam, George W., Jr. 238-S
Eian, C. S. 126-H
Eichel, Karl 290-D
Eicke, H. 301-P, 346-P
Eickhoff, Klaus 231-M
Eilender, Walter 23-D, 274-F
Eilertsen, N. A. 14-B
Eipeltauer, E. 190-S
Eisenberg, M. 11-P
Eisenhardt, G. H. 595-Q
Eisenkolb, Friedrich 364-G
Eisenkolb, Fritz 160-B
Eisermann, F. 267-N
Eisler, Stanley L. 63-L, 543-L, 578-L, 130-R
Ekholm, L. G. 135-A
Ekins, Ron 249-J
Elkins, R. L. 414-R
Eller, S. A. 309-K
Ellinger, G. A. 692-L
Ellingham, H. J. T. 4-C
Elliot, G. D. 233-D
Elliott, E. 39-V
Elliott, H. E. 220-E
Elliott, J. F. . . . 192-D, 196-P, 384-P
Elliott, R. P. 351-M
Elliott, Scott 116-F
Ellis, O. B. 261-R
Ellis, Wells E. 973-Q, 199-R
Ellwood, E. C. 3-C
Elonka, Steve 564-L
Elschner, Bruno 65-M
Elsesser, T. M. 398-Q, 399-Q
Elson, R. 230-P
El Wakkad, S. E. S. 111-P
Elze, J. 175-R
Emanuele, F. 180-F, 79-T
Embden, H. J. Meerkamp Van. . . . 227-T
Emel'ianov, D. S. 168-B
Emerson, Charles 584-K
Emicke, Klaus 309-A
Emod, Gyula 223-F
Enander, B. 118-M
Ence, Elmars 78-M
Ende, Hans vom 14-D, 25-S
Eney, W. J. 310-Q

Engel, A. I. 76-B, 201-B, 24-S
Engel, Annemarie, ... 433-P
Engel, Olive G. 202-N
Engel, Rosemarie 509-Q
Engelhardt, W. 152-Q
Engelmeier, D. W. 228-P
Englander, Marcel L. 388-M
Engle, Edward 422-L
Englisch, C. 347-E
English, P. H. 224-Q
Enke, Hermann 203-A
Ennard, K. 629-D
Ennon, A. E. 154-M
Enos, George M. 272-J
Ensch, Louis 313-D
Ensslin, Fritz 95-S
Entwisle, A. R. 365-Q
Epelboin, L. 126-L, 719-L, 91-P
Epifanov, G. L. 88-G, 89-G
Eppelsheimer, D. S. 382-M, 304-N, 624-Q
Foreman, E. 382-Q
Epstein, Leo F. 138-P
Erard, H. R. 196-Q
Erbe, J. Raymond 148-F
Erber, G. 570-Q
Erck, L. J. 51-B, 169-B
Erdman, Donald C. 315-R, 305-S
Erdman, E. 342-E
Erdmann, R. 320-L, 723-L
Erdmann-Jesnitzer, Friedrich . . . . . .191-E, 377-G, 660-K, 229-N, ... 230-N, 269-N, 301-N, 503-Q
Ergang, R. 504-Q
Ergler, P. C. 302-K
Erickson, J. L. 407-Q
Erickson, Burton 719-Q
Erickson, Carl 180-G
Erickson, H. A. 348-T
Erickson, Henry W. 46-B
Erickson, V. H. 46-M
Erikson, Stig-Erik . 12-J, 253-K, 582-K
Erinjeri, A. Cemal 713-Q
Erker, A. 581-L, 528-Q
Erlich, L. B. 80-Q
Ermolchenko, E. Z. 178-J
Erne, Georg 64-D
Ernst, Hans 76-G
Ernst, Hellmut 204-A
Erra, Antonio 392-S
Erwall, L. G. 231-Q
Esaki, Leo 142-P
Eschbacher, Earl W. 56-Q
Eshelby, J. D. . . . . .

Farmer, M. H. 134-Q
Farr, A. P. 165-R, 469-R
Farrar, Gerald L. 160-R, 168-R, 185-R
Farrell, Dan 71-A
Farrer, T. W. 99-R, 142-R, 178-R
Fassell, W. Martin, Jr. 419-R
Fast, J. D. 45-A, 50-K
Fastov, N. S. 318-N
Faulkner, E. A. 141-P
Faupel, J. H. 396-Q
Faure, Bernard 39-E
Faust, C. L. 289-K, 36-L,
. . . . . 339-L, 340-L, 677-L
Favre, A. E. 242-F, 245-F
Fawcett, W. E. 5-B
Faxon, William O. 637-E
Fay, E. L. 79-S
Fayles, R. Russell 51-D, 144-D
Feather, N. 88-M
Fedan, Sidney H. 167-T
Fedock, M. P. 70-D
Fedotov, L. E. 256-J
Fedotov, S. G. 19-J, 921-Q
Feeney, L. E. 428-K
Feige, Werner 90-J
Feigenbaum, S. . . 159-D, 234-D, 174-T
Feigl, F. 165-S
Feil, E. 85-E
Fein, A. E. 7-P
Feirer, John L. 87-G
Feitknecht, W. . . 104-P, 53-R, 114-R
Feldmann, Heinz D. 115-F
Feldmann, Wilhelm 216-L
Feldshtein, E. I. 284-G
Fell, E. W. 67-N
Fellows, Roger L. 740-L
Felmley, C. R. 58-Q
Feltham, P. 823-Q
Feng, I-Ming 567-Q
Fenn, A. P. 7-L
Fenner, A. J. 190-Q
Fentress, J. 16-V
Ference, G. G. 717-L
Ferguson, Charles A. 31-L, 76-L
Fergusson, H. B. 373-Q
Fernheden, Gothe 486-E
Fernlund, Uno 192-S
Feron, J. 107-R, 108-R
Ferrand, Georges 27-Q
Ferrand, L. 120-C
Ferri, A. 446-R
Ferro, A. 274-M
Ferry, J. E. 80-D
Ferry, John J. 344-K
Fessler, H. 267-Q
Feuerstein, W. J. 279-N
Feustel, R. G. 141-M
Fickett, W. R. 136-N
Fickle, D. P. 251-M
Fiedler, G. H. 288-K
Field, E. N. 235-E
Field, J. 250-F
Fielding, R. 620-Q
Fields, P. R. 228-P
Fields, R. E. 183-P
Figour, H. 247-T
Filasiewicz, K. 283-F
Fillinger, Charles 49-H
Finch, G. I. 283-L
Finch, S. L. 269-E
Findlay, Alexander 27-M
Findley, William N. 789-Q
Fine, M. E. 471-P, 300-Q, 651-Q
Fineman, Manuel N. 198-L, 658-L
Fink, Kurt 90-Q, 390-Q, 486-Q
Finkbone, B. P. 277-A
Finkelnburg, Hans H. 235-G
Finkel'shtein, B. N. 318-N
Finlay, W. L. . . . . .
. . . . 28-C, 11-M, 168-Q, 37-V, 76-V
Finley, E. M. 255-Q
Finn, George 459-P
Finn, Willy K. 125-B
Fiorentino, R. J. 137-N
Fischer, A. 280-E, 517-L
Fischer, C. Wilhem 14-D
Fischer, H. 223-G, 175-R
Fischer, L. W. 371-S
Fischer, Marc 54-T
Fischer, R. 107-D
Fischer, Roland, B. 225-A, 301-E
Fischer, Wilhelm Anton 252-D
Fishel, W. P. 282-N
Fisher, G. P. 988-Q
Fisher, J. C. . . . 90-N, 163-N, 165-N,
. . . . . 186-N, 190-N, 404-Q, 539-Q
Fisher, M. S. 341-Q, 343-Q
Fisher, P. A. 565-Q
Fisher, R. M. 132-N
Fisk, H. 654-K
Fitterer, G. R. 332-D, 334-D
Fitzer, E. 2-H, 72-J, 200-L,
. . 448-L, 520-L, 208-R, 473-R, 488-R
Fitzler, H. A. O. 322-L
Fitzsimmons, W. M. . . . 203-G, 238-G
Flammer, Neil 313-A
Flanigan, A. E. 186-Q
Fleischmann, M. 5-Q, 973-Q
Fleming, D. 587-E, 589-E, 611-E
Fleming, Marston G. 23-B
Fletcher, G. C. 422-P
Fletcher, Leslie S. 127-S, 211-S
Fletcher, R. C. 124-J, 500-P
Fletcher, Stewart G. 175-T

Fletcher, W. A. 188-F
Fleury, R. de 647-Q
Flinn, P. A. 135-M
Flint, D. 221-R
Flint, R. V. 184-D
Floe, C. F. 115-J, 228-J
Flood, H. 96-B
Flotats, Justo Ferrer 98-N
Floyd, A. L., Jr. 113-M
Floyd, R. W. 186-M
Flückiger, H. 155-L
Flugge, S. L. 28-F, 364-L
Fluharty, J. A. 481-K
Fluharty, Rex 158-S
Flusin, F. 432-Q
Flynn, Francis W. 484-R
Flynn, P. H. 101-G
Fochtman, E. G. 717-L
Foex, G. 424-P
Foex, M. 485-P
Folberth, O. G. 801-Q
Foley, Edward F., Jr. 549-L
Foley, F. B. 872-Q
Fomina, M. A. 148-R
Foner, Simon 383-P
Fontaine, William E. 272-J
Fontana, Mars G. 94-R, 158-R, 226-R, . . 242-R, 332-R, 376-R, 417-R, 467-R
Foote, J. Howard 49-B
Footner, H. B. 323-L
Forbath, Robert 287-D
Forbes, M. C. 169-R
Forbes, R. J. 123-A
Ford, Hugh 665-Q
Ford, S. D. 397-M
Foreman, Hugh H. 130-J
Forestek, Clarence 356-L
Forestier, H. 238-N, 345-P
Forgeng, W. D. 405-M
Forkois, H. M. 591-Q
Forland, T. 96-B
Formaget, P. 543-K
Forman, Milton 574-K
Forrest, G. 247-Q
Forrest, P. G. 74-Q
Forrest, P. J. 281-A
Forsling, Wilhelm 118-C
Forsman, Otto 66-Q
Forssman, Sven 62-K
Förster, F. 188-S, 245-S
Forster, Martin 24-D
Forsthoff, C. W. 370-P
Forsyth, P. J. E. 106-E, 199-Q
Forty, A. J. 126-N
Forward, F. A. 232-B
Foster, Arch L. 267-R
Foster, Bruce P. 246-P
Foster, John H. 261-K
Fotiadi, A. 260-Q
Foulke, D. Gardner 405-L
Foulon, A. 582-L
Fountain, Richard W. 175-Q
Fournet, Gerard . . 364-M, 72-N, 226-N
Fowler, Henry H. 67-A
Fowler, R. M. 11-S
Fowler, R. T. 86-D, 40-F
Fralich, Robert W. 254-Q
Francillard, G. 213-F
Francis, A. J. 635-K
Franck, Robert J. 161-E, 428-E
Franck, U. F. 138-R
Frank, F. C. . 89-N, 126-N, 262-N, 287-Q
Frank, V. 144-P, 402-P
Frankau, A. M. 218-D, 312-D
Franke, Erich 154-R, 474-R
Franklin, A. D. . . 77-H, 109-H, 182-P
Franses, James 87-C
Fraser, George T. 175-T
Frauenfelder, K. 186-J
Frazier, L. R. 73-V
Frederick, Max, Jr. 379-L
Fredholm, L. 115-D
Freedman, Samuel 41-K
Freeman, Robert B. 257-L
Frenay, E. 13-C
French, S. F. 19-B
French, W. 204-F
Frerichs, R. C. 290-N
Freudenthal, A. M. 257-Q
Frey, K. 348-K, 668-K
Frick, Federico 379-S
Frick, Frederick F. 62-D
Fridmann, Ia. B. 775-Q
Friedel, J. 152-P, 371-Q
Friedensburg, Ferdinand 34-A
Friedlander, W. H. 407-G
Frischman, T. A. 24-J
Frisius, E. N. 248-R
Fritz, E. G. 139-S
Fritz, J. C. 742-L
Frocht, M. M. . . . 422-Q, 703-Q, 705-Q
Frohmberg, R. P. 968-Q
Frolov, A. P. 785-Q
Frommelt, H. A. 337-G
Frommer, H. G. 152-K
Fromson, Robert E. 30-E
Frost, N. E. 37-Q, 51-Q, 130-Q, 222-Q, 621-Q
Frost, P. D. . . . 227-J, 385-M, 57-N
Frost, W. E. 24-T
Frostick, Harold G. 157-R
Froula, H. 181-M
Fry, Eugene 424-E
Fry, H. L. 124-Q

Frye, J. H., Jr. 60-N
Frye, S. C. 603-L
Fryxell, Robert E. 9-R
Fuchs, E. 528-K
Fukuroi, Tadao 57-P
Fukushima, Toshiro 613-L
Fule, Endre 813-Q
Fuller, D. D. 684-Q
Fuller, M. L. 284-M
Fuller, T. S. 71-Q
Fullerton, J. R. . . . . .
. . . . . 185-K, 353-K, 550-K, 700-K
Fullman, James B. 466-R
Fullman, R. L. . . 25-H, 380-M, 404-Q
Fung, Y. C. 628-Q
Funk, C. W. 176-M
Fuqua, J. H. 204-Q
Furbeck, A. R. 396-Q
Furberg, S. 246-M, 363-M
Fuschillo, N. 463-P
Fusfeld, Herbert I. 456-P
Fuszara, Lester T. 242-L
Fuyat, Ruth K. 383-M
Fydell, J. F. 100-N, 253-N

G

Gabler, F. 327-M
Gabriel, A. R. 343-T
Gabriel, George P. 425-R
Gabrielson, Gunnar 232-L
Gadd, E. R. 931-Q
Gager, W. B. 103-P
Galanty, A. 283-F
Galbraith, W. 86-M
Gale, B. 547-E, 612-E
Gale, W. S. 591-K
Gallagher, C. J. 8-Q
Galletto, Corrado 121-E
Gallmeyer, William C. 183-G
Galloway, K. A. 160-G
Gallup, Milton 29-T
Gally, S. K. 343-R
Galtung, Engel 279-R
Gantz, M. E., Jr. 302-E
Garaycochea, I. 264-M
Garber, R. E. 776-Q
Garcia Martin, Z. 1023-Q
Gardam, G. E. 31-V
Gardner, A. G. 251-G, 39-H
Gardner, N. K. 613-K, 649-K
Gardner, Todd 130-J
Gardtman, Gustaf 373-K
Gare, Marshall S. 299-S
Garkunov, D. N. 1048-Q
Garnier, Henry 111-J
Garofalo, F. 653-Q
Garrett, C. V. 281-S
Garwood, G. L. 342-R
Garwood, R. D. 122-N
Gascuel, Louis 86-F
Gatewood, B. E. 498-Q
Gatto, F. 43-Q, 950-Q, 951-Q
Gattringer, Reinhold . . . 95-N, 300-N
Gau, M. 161-T
Gaudin, A. M. 3-B, 87-B, 99-P
Gauthier, G. 471-R
Gauthier, V. J. 121-G
Gauvin, W. 265-L
Gavrilenko, N. 49-F
Gay, J. A. 91-C
Gay, P. 215-M, 748-Q, 1051-Q
Gayley, Charles T. 271-K
Gebhardt, Erich . . . . . .
. . . . . 41-M, 230-M, 170-N, 1043-Q
Gee, C. C. 362-T
Gehr, Walter . . . 211-A, 285-A, 314-A
Geil, Glenn W. 165-Q
Geiringer, Hilda 734-Q
Geisler, A. H. 129-J, 272-M,
. . 300-M, 161-N, 167-N, 207-P, 225-P
Geissman, William C. 407-L
Gélain, Jean 160-E
Gel'd, P. V. 208-N, 58-P, 169-P
Geleji, A. 127-C, 214-F, 281-G
Gelinas, R. W. 753-Q
Geller, Werner 278-D
Gembol, V. L. 523-L
Gemmill, M. G. 627-Q
Gence, P. 268-N
Generozov, B. A. 144-B
Genkin, V. M. 434-M
Gensamer, M. 1031-Q
Gent, Ernest V. 48-G
Gentner, F. 222-J
George, C. W. 339-Q
George, Ernest E. 53-V
George, Frank 78-K
Gerard, George 714-Q, 886-Q
Gerber, Erich 734-L
Gerhardsson, Gideon 62-K
Gericke, Siegfried 55-D
Gerken, J. M. 657-K
Gerl, L. 456-L
Gerla, M. K. 101-Q
German, S. I. 632-K
Gero, J. B. 101-D
Gerritsen, A. N. . 85-P, 439-P, 443-P
Gerstenmaier, J. H. 262-K
Gerstner, Franz 218-A
Gerth 116-B
Gertsman, S. L. 96-M
Gertsriken, S. 193-N
Gervais, Andre M. 255-N

Gesche, G. 27-L
Geschelin, Joseph . . . 2-A, 50-F, 134-F
Gesell, W. 356-E
Gessner, Fritz 365-K
Gevers, M. 330-P
Gevers, R. 432-R
Geyer, R. 193-S
Geyers, R. 99-M
Ghiglieno, Carlo 75-H
Ghosh, A. 358-P
Giachino, J. W. 142-G
Gianola, Cornelio 184-J
Gibb, Thomas, R. P., Jr. 57-M
Gibbons, Donald F. 901-Q
Gibbs, M. B. . . . 30-L, 122-L, 357-L
Gibson, A. F. 416-P
Gibson, Glenn J. 272-K
Giedtrov, N. T. 259-A
Gier, J. de 227-T
Gieser, Ralph H. 205-L
Gifford, H. P. 31-F
Gifkins, R. C. . . . 164-N, 363-Q, 882-Q
Gigliotti, Anthony 480-L
Gilbert, G. N. J. 979-Q
Gilbert, H. L. 56-C, 52-F
Gilbert, Lew. 202-K, 309-S
Gilbert, Lloyd 399-L
Gilbert, P. T. 225-R, 456-R
Gilbert, R. A. 297-Q
Gilchrist, J. D. 50-D
Giles, P. C. 617-Q
Gill, E. T. 589-K, 695-K
Gill, S. S. 1-Q
Gillam, E. . . 263-N, 302-N, 1-S, 121-S
Gilman, John J. 6-N, 97-Q, 751-Q, 897-Q
Gimmel, P. 110-Q
Gindin, L. G. . . . 349-R, 350-R, 369-R
Gingerich, E. M. 302-E
Ginguené, J. 181-L
Ginther, Gordon B. 344-K
Girini, Joseph R. 271-K
Girschig, R. 804-Q
Gittleman, W. 216-Q
Gittus, J. 418-E, 619-E
Gitzen, B. 93-V
Giudicelli, Guy 417-G
Glander, Fritz 336-L
Glander, Wilhelm 336-L
Glaser, F. W. 27-H, 64-H
Glaser, Leo B. 130-T
Glaysher, G. H. 134-Q
Glaza, T. J. 414-E
Glazunov, A. A. 263-T
Gledhill, P. K. 130-B
Gleiser, Molly 151-P
Glemser, O. 338-M
Glen, A. Earle. 358-G, 35-H
Glenn, E. E., Jr. 353-R
Glenn, P. A. 356-S
Glennan, T. Keith 158-S
Glick, H. L. 13-N
Glick, Phillip 32-H
Glikman, L. A. 314-Q, 774-Q
Glikshtern, A. M. 320-K
Göbel, August 41-C
Gobus, Alexander 221-S
Godard, Hugh P. 331-R
Godfrey, Douglas 989-Q
Goeckermann, R. H. 370-P
Goetcheus, Paul 41-V
Goetz, George A. 561-L
Gokcen, Nev A. . . . 56-N, 58-N, 410-P
Gokyu, I. 17-N
Goland, M. 692-Q
Golay, Marcel J. E. 118-N
Goldberg, A. 85-N, 977-Q
Goldberg, B. 589-Q
Goldberg, C. 114-M, 203-S
Goldberg, J. E. 553-Q, 702-Q
Goldberg, Murrey D. 189-M
Goldemberg, J. 249-P
Golden, Lex B. . . 159-R, 198-R, 270-R
Goldfein, Harold 81-D
Goldman, Irwin 43-S
Goldman, J. E. 193-P
Goldman, M. 671-Q
Goldschmidt, P. 512-K
Goldspiel, S. 208-M
Golomb, Michael 688-Q
Golovner, T. M. 357-M
Gombas, P. 241-M
Gombert, M. 370-D
Gonikberg, M. G. 511-P
Gonser, Bruce W. . 84-A, 156-B, 345-S
Gonzalez, Alfredo 205-B, 329-D
Goodbar, Joseph A. 66-G
Goodchild, K. T. 474-Q
Goodenough, John B. 60-M
Goodeve, C. F. 823-Q
Goodeve, Charles 6-V
Goodier, J. N. 690-Q
Goodman, B. B. 146-P
Goodman, David 175-S
Goodwin, H. B. 297-Q
Goodwin, Lew W. 33-G
Goodzeit, Carl L. 923-Q
Goosens, H. C. 64-K
Gorbunov, N. S. 33-Q, 272-Q
Gordet, A. 385-L, 531-L
Gordon, D. I. 192-P
Gordon, R. B. 163-F
Gordon, Robert M. 204-K, 296-K
Gorgen, Robert 352-D
Goring, A. W. 43-B

Gorliss, L. M. 243-M
Gorman, J. 267-E
Gorsuch, G. H. 634-E
Gorter, E. W. 271-P
Goss, A. J. 355-M, 68-N, 218-N
Goss, Norman P. . 283-Q, 681-Q, 55-T
Gosslett, V. E. 163-M
Gostin, E. Lamar 376-L
Goter, E. R. 196-B
Göttsche, H. 180-N
Gottschol, H. J. 134-C
Gotz, W. 603-E
Götzl, F. 452-L, 526-Q
Gow, J. T. 386-R, 19-T
Gow, K. V. 319-Q, 1036-Q
Graaf, J. E. de 16-B
Grable, G. B. 512-Q
Grace, Richard E. 155-N
Graef, R. 66-D
Graf, Ludwig 465-Q, 444-R
Graham, Alex L. 297-E
Graham, H. F. 157-E
Graham, John W. 102-H
Graham, J. P. 45-B
Graham, Quentin 137-D
Graham, R. 118-J, 67-Q
Grahame, David C. 134-P
Grainger, S. 481-L
Grand, Louis 240-E
Granjon, Henri . . . . . .
. . 141-K, 386-K, 539-K, 634-K, 686-K
Grant, J. W. 254-N, 306-N
Grant, Nicholas J. 74-D, 226-J, 59-M,
. . 124-M, 255-N, 293-N, 6-Q, 77-Q,
. . . 166-Q, 171-Q, 406-Q, 893-Q, 60-S
Granville, J. W. 281-P
Grassi, R. C. 21-G
Grassmann, Peter 219-G
Graversen, Curtis L. 408-E
Graves, J. D. 8-T
Graviche, Jacques 431-E
Gray, Allen G. . . 27-A, 125-A, 117-C,
. . 298-D, 407-E, 21-L, 53-L, 134-L,
.172-L, 178-L, 179-L, 266-L, 294-L,
. . 477-L, 465-P, 152-Q, 232-Q, 268-R
Gray, A. N. 85-F, 589-L
Gray, A. P. 173-P
Gray, Daniel 37-L
Grechnyi, Ia. V. 317-M
Green, A. 14-M
Green, A. E. 423-E, 578-Q
Green, A. P. 40-G, 577-Q
Green, George 60-B
Green, Harry 205-J
Green, Herbert S. 124-P
Green, H. W. 991-Q
Green, William L. 68-K
Greenawalt, R. E. 157-J
Greenaway, H. T. 36-S
Greenberg, H. J. 733-Q
Greenberg, S. 421-R
Greenblatt, J. H. 372-R
Greenidge, C. T. 144-E, 297-Q
Greenland, K. M. 389-S
Greenough, G. B. 854-Q
Greenwald, Selma 261-M
Greenwell, Howard E. . . 75-R, 412-R
Greenwood, F. H. 188-G
Greenwood, H. M. 60-H
Greenwood, H. W. . . . 9-H, 66-H, 115-H
Greenwood, J. Neill 269-Q
Gregory, Edwin 61-A, 95-M, 77-Q
Greif, Lucien R. 337-K
Greil, E. A. 495-K
Grice, C. S. W. 131-A
Gries, H. 210-E
Griese, Friedrich W. 370-K
Griess, J. C., Jr. 154-C
Griffin, Arnold . . . 33-B, 113-B, 88-C
Griffiths, A. H. 1-F
Grigarov, V. N. 100-H
Grigorovich, V. K. 775-Q
Grillot, Edmond 445-P
Grimshaw, Leonard C. 64-S
Grindrod, John 35-P
Grinstead, Robert R. 168-M
Gripenberg, Nils L. 36-F
Gris, Jean 262-Q, 459-Q
Grjotheim, K. 96-B
Grobe, Arthur H. 285-N
Grodner, A. 280-K
Grodzinski, P. . . . 48-Q, 259-Q, 358-Q
Groenendijk, A. 487-L
Groetzinger, Gerhart 184-N
Grogan, K. C. 94-B
Groodov, P. P. 113-G
Gross, B. 761-Q
Gross, Gilbert 58-G
Gross, J. H. 142-Q
Grossman, Norman 162-K
Grossmann, M. A. 166-J
Grote, Gerald P. 112-G
Grotke, G. 211-K
Ground, A. E. 336-S
Grover, H. J. 217-Q, 572-Q
Grover, La Motte 554-K
Grube, H. L. 299-L
Grube, K. 118-E
Gruber, B. A. 54-H
Gruen, G. J. 221-A
Grugin, P. L. 12-N
Gruhl, W. 69-M
Grum-Grzhimailo, N. V. 392-P
Grunberg, L. 148-P, 298-P

Grunberg, R. 369-E, 468-E, 471-E, 601-E, 273-Q
Gründer, W. 123-B
Grundig, Werner. 1046-Q
Grungo, G. 56-D
Grupp, George W. 328-L, 510-L
Grütter, K. 426-P
Gualandi, D. 377-M, 42-Q
Guarnieri, G. J. 386-Q
Guba, F. A. 229-R, 424-R
Gubkin, S. I. 217-F, 785-Q
Gude, William G. 180-E
Gudrych, V. 267-D
Gudtsov, N. T. 195-N
Guedras, Andre 528-L
Guedras, Marcel 470-E
Guernsey, Roscoe 703-Q
Gueussier, Andre 159-Q
Guggenheim, E. A. 111-M
Guilhaudis, A. 42-R
Guillet, L. 268-N
Guinard, Charles 307-K
Guingand, J. 181-L
Guinier, Andre 55-M, 410-M, 312-N, 431-Q
Guintini, Pierre 445-P
Guitton, L. 19-V
Gulbransen, Earl A. 331-M
Gulliksen, J. W. 65-G, 82-G
Gulyaev, A. P. 194-N, 242-N
Gumbel, E. J. 257-Q
Gunn, J. B. 239-P
Gunn, K. W. 247-Q
Gunnert, R. 151-J, 224-J
Gupte, P. K. 149-B
Gurney, G. C. 1051-Q
Gurnham, C. Fred 683-L
Gurinsky, D. 42-F
Gustin, J. P. 624-K
Gusyev, V. V. 494-Q
Guthmann, Kurt 205-D, 244-S
Gutknecht, Alfred 164-T
Guttman, Lester 45-M, 1-P, 2-P
Guy, A. G. 125-R
Guyot, F. 521-K
Guzov, S. G. 199-G

H

Haarmann, R. 366-R
Haarmann, W. 240-L
Haas, G. 531-L, 646-L, 687-L
Haasen, P. 501-Q
Habart, Herb 158-J
Haberthur, W. E. 145-D
Hackerman, Norman 135-P, 353-R, 254-S
Hackett, W. B. 232-F
Hackney, J. C. 98-C
Hackstedde, M. E. 84-J
Hackstein, Karl-Gerhard 651-L
Hadden, S. E. 480-R
Hadley, C. P. 82-P
Hadley, R. L. 61-C
Haefer, R. 426-M
Haertlein, J. B. 116-H
Haferd, A. M. 305-Q
Haffner, Eduard K. L. 216-F
Hagan, H. H. 286-K
Hagan, R. E. 221-B
Hagedorn, Heinz 277-D
Hagenberg, R. 227-T
Hagg, G. 16-M
Hahn, Robert S. 280-G, 303-G
Haight, Bruce E. 12-L
Haine, M. E. 341-M
Haissinsky, M. 105-P, 106-P
Hajto, Nandor 814-Q
Halbrecq, L. 257-D
Hale, Robert S. 210-K
Haley, Floyd C. 113-P
Halgren, J. A. 204-J
Hall, A. M. 137-N, 123-R, 385-R, 387-R
Hall, A. R. 117-H
Hall, Colby D., Jr. 135-P
Hall, E. O. 641-Q, 794-Q
Hall, G. E. 45-B
Hall, Henry S. 170-D
Hall, John Howe 214-E, 306-E, 260-J, 292-N
Hall, Lewis D. 566-Q
Hall, Nathaniel 36-L, 37-L, 39-L
Hall, W. H. 127-M
Hall, W. J. 610-Q
Hall, W. Keith 132-P
Haller, M. 41-D, 42-D
Hallett, M. M. 442-Q
Halliday, W. M. 148-E, 151-E, 334-E, 353-E, 454-E, 255-K, 123-L
Halloran, D. 344-S
Hallowell, F. C., Jr. 687-Q
Halls, E. E. 157-L, 268-L, 370-L, 443-L, 552-L
Halmos, Gyorgy 292-G, 125-H
Halpern, J. 84-B, 232-B, 473-P
Halpern, Leopold 29-P
Halsey, R. B. 92-D
Halteman, E. K. 13-N
Hamaker, John C., Jr. . . 131-E, 206-Q
Hamann 116-B
Hamermesh, Bernard 371-P
Hamilton, A. D. C. 95-R
Hamilton, J. 182-M
Hamjian, H. J. 78-H, 133-N
Hammarlund, P. E. 195-D

Hammer, H. L. 11-S
Hamming, R. W. 116-P
Hammond, D. W. 311-E
Hammond, Joseph P. 24-M, 98-Q, 896-Q
Hammond, Rolt 63-K, 190-L, 16-T, 69-V
Hammond, W. E. 304-R
Hammond, William R. 234-P
Hanawalt, J. D. 66-A
Hancock, P. F. 20-J
Hand, R. Lowell 380-K
Handley, Thomas H. 275-P
Hanemann, Heinrich 191-E, 141-G, 54-M, 218-M
Hanink, D. K. 237-L
Hannon, C. H. 1-R
Hansen, H. H. 198-T
Hansen, M. . . . . 137-J, 44-M, 72-M, 73-M, 223-M, 224-M, 353-M, . . . 386-M, 274-N, 275-N, 40-V, 73-V
Hanslip, R. E. 585-Q
Hanson, D. 528-E
Hanson, H. P. 145-P
Hanson, M. P. 604-Q
Harbach, G. L. 239-E
Harder, O. E. 386-R
Hardrath, Herbert F. 1012-Q
Hardy, A. A. 40-T
Hardy, A. F., Jr. 144-A
Hardy, H. K. 142-M, 143-M, 157-M, 158-M, 422-M
Hardy, V. H. 111-S
Hargitay, Sandor 478-E
Hargreaves, L. 274-E
Hargreaves, M. E. 138-Q, 917-Q
Harkins, F. G. 44-K, 570-K
Harley, T. H. 148-D
Harnden, G. H. 347-S
Harner, Joe 303-K
Harnisch, Albert 349-D
Harnsberger, A. E. 320-R
Harple, Warren W. 135-R
Harr, R. E. 404-L
Harrington, R. H. 329-P
Harris, Donald E. 342-L
Harris, F. E. 103-J
Harris, G. B. 282-M
Harris, G. T. 646-Q, 846-Q
Harris, H. 137-J
Harris, Jay C. 493-L, 405-R
Harris, John N. 301-S
Harris, L. A. 993-Q
Harris, W. B. 183-K
Harris, W. J., Jr. . . . 77-N, 210-S, 325-S
Harris, W. R. 27-F
Harrison, E. H. 753-Q
Harrison, Harold T. 73-H
Harrison, H. R. 118-T
Harrison, H. S. 126-B
Harrison, W. N. . . . 436-L, 729-L, 357-R
Harsell, T. L. Jr. 59-E
Hart, A. 394-M
Hart, Donald P. 519-Q
Hart, E. W. 165-N, 180-Q
Hart, R. J. 7-S
Hart, R. K. 70-L
Hartbower, Carl E. 408-K, 683-Q, 924-Q
Harten, K. P. 17-A
Hartman, A. 829-Q, 995-Q
Hartman, David E. 377-L
Hartmann, Helmut 99-C
Hartnagel, D. 93-N
Hartnett, J. P. 454-P
Harvey, Clarence C. 295-R
Harvey, J. M. 275-Q
Harvey, R. B. 373-Q
Harvey, Richard F. 59-J, 182-J
Harwood, Julius J. 333-T
Haslam, R. N. H. 174-P
Hassell, Peter A. 237-J
Hastings, C. H. 207-S
Hastings, J. 35-M, 243-M
Hatch, G. B. 429-R
Hatschek, R. L. 70-C, 38-V
Hatton, J. 141-P
Hatwell, Henry 359-G
Hauck, Charles F. 140-S
Haufe, Gottfried 212-B
Hauffe, Karl 44-R, 216-R, 302-R
Haug, Peter 376-M
Hauptman, H. 321-M
Hauri, C. F. 155-A
Haurin, Walter 69-R
Hauschild, U. 338-M
Hausman, H. J. 46-P
Hausner, H. H. 2-H, 86-H
Hauttmann, H. H. 248-F, 314-G
Haven, W. A. 294-A
Havre, Horace 176-B
Hawes, Warren L. 195-B
Hawkes, M. F. 70-N
Hawkings, R. C. 156-P
Hawkins, J. 218-T
Hawthorne, Lowell H. 117-K
Hayama, Fusao 567-L
Hayashi, Ikuhiko 304-G
Hayes, E. E. 174-N
Hayes, E. T. . . . 126-M, 225-M, 70-V
Haynes, Harold W. 195-E
Haynes, J. R. 232-P
Hays, N. E. 526-L
Hayward, Carle R. 33-V
Hayward, H. N. 5-R
Hazel, John J. 47-D
Hazlett, Thomas H. 172-Q, 971-Q

Head, A. K. 87-M, 96-Q, 258-Q, 926-Q, 984-Q
Heal, H. T. 1-S
Healey, F. H. 110-P
Healy, G. W. 197-D
Healy, J. H. 243-L
Heard, L. S. 659-L
Hearmon, R. F. S. 640-Q
Heath, R. V. 425-E
Heathcote, Alan 195-T
Heavens, Oliver S. 202-M
Heber, G. 74-P, 155-P
Heberling, Hans 654-L
Hedberg, J. D. 148-N
Heddle, T. A. 352-P
Hedges, E. S. 18-C, 489-L
Hedlund, R. C. 662-L
Hedvall, J. A. 45-H, 30-P
Heffernan, G. R. 95-A, 243-D
Hegedus, Zoltan 368-R
Heidenreich, R. D. 15-M, 269-M, 208-P
Heilmann, Gerhard 297-L
Heimerl, George J. 793-Q
Hein, G. 315-N
Heine, R. W. 281-E, 443-E, 532-E
Heinrichs, F. 236-G
Heisler, Jere Y. 4-F
Heisler, M. P. 554-Q
Helbig, Walter A. 38-L
Heller, S. R., Jr. 557-Q, 697-Q
Helling, Werner 162-C
Hellstrand, E. 212-P
Helmer, Govert 329-M
Hempel, A. R. 128-L
Hempel, Max 486-Q
Henderson, F. 575-Q
Henderson, G. A. 102-F
Henderson, Harvey E. 178-E
Henderson, J. C. 411-P
Henderson, J. G. 318-A
Henderson, K. V. 304-A
Henderson, T. A. 3-C
Hendrickson, Thomas Andrew . . 11-B
Hengstenberg, Otto 764-Q
Henkel, S. 943-Q
Henkels, H. W. 455-P
Henley, R. G., Jr. 231-L
Hennessy, F. P. 189-G
Henning, F. 436-R
Henning, R. W. 61-C
Henricks, R. P. 68-E
Henrion, R. 48-J
Henry, Norman F. M. 145-M
Henzlik, William C. 419-K
Herbert, D. C. 23-Q, 441-Q
Herbiet, H. 243-K, 183-Q, 179-T, 257-T
Herenguel, J. . . . . 647-L, 349-Q, ... 803-Q, 67-R, 324-R, 376-S, 15-V
Heritage, R. J. 307-L
Herkart, P. G. 481-P
Herkenhoff, Earl C. 178-B, 192-B
Herman, Frank 89-M
Hernandez, A. 121-J
Herne, H. 40-S
Herold, Richard 6-E
Herrera, Oscar 375-S
Herring, E. V. 20-B
Herrmann, E. . . . 108-C, 390-K, 532-L
Herrmann, G. 693-Q
Herrmann, Robert H. 182-E
Hersh, Herbert N. 218-P
Hershey, A. V. 725-Q
Hersping, Alfons 130-P
Hertel, Jerome 265-K
Herzog, E. 113-Q
Hess, E. A. 691-K
Hess, P. M. 219-L
Hesse, Werner 199-N
Hessenberg, W. C. F. . . . 247-J, 263-J
Hetenyi, M. 729-Q
Hettembourg, P. 346-D
Hetzler, M. 133-S
Heumann, Theo . . 142-N, 177-N, 215-N
Heuschkel, J. 11-K, 97-K, 223-K
Hewitt, J. 230-Q
Hewitt, W. H. 107-P
Heydenburg, N. P. 244-P
Heyer, R. H. 1002-Q, 1003-Q
Heyman, J. 736-Q
Heywood, R. B. 391-Q, 1013-Q
Hibbard, W. R., Jr. 130-N, 535-Q, 892-Q
Hibberd, H. M. 175-E
Hickisch, H. 475-E
Hickling, A. 669-L, 111-P
Hickman, William A. . . . 606-K, 158-T
Hicks, Tyler 254-K
Hiesinger, L. 563-L
Hietzmann, H. A. 170-T
Higgins, Carter C. 307-T
Higgins, J. K. 669-L
Higgins, T. R. 13-Q
Highriter, H. W. 343-T
Hildebrand, Gösta 68-Q
Hildebrand, J. F. 207-Q
Hildebrandt, Arnold 242-G, 266-G
Hilgers, W. 134-C
Hill, Charles C., Jr. 141-S
Hill, George Richard 354-R
Hill, H. N. 717-Q
Hill, R. . . . . 51-F, 114-F, 40-G, . 285-G, 50-Q, 320-Q, 321-Q, 322-Q, 323-Q, 324-Q, 325-Q, 327-Q, 328-Q, . . 329-Q, 330-Q, 564-Q, 737-Q, 796-Q

Hill, R. B. 150-M
Hill, R. D. 247-P
Hill, Robert C. 45-D
Hill, R. W. 446-L, 339-P
Hillebrand, W. F. 251-S
Hillen, Gunter 507-Q, 508-Q
Hiller, Dale M. 320-P
Hiller, H. M. 200-E
Hiller, Johannes E. 207-M, 305-P
Hillert, M. 271-J
Hilliard, J. E. 7-M
Hilliard, R. V. 58-C
Hillier, H. 117-R, 391-R
Hillner, Gerhardt Friedrich . . . 247-M
Hilton, B. Richard 246-A
Hilty, D. C. 197-D, 22-M
Himmel, L. 158-N
Hinchcliffe, R. 91-E
Hindson, R. D. 127-A, 160-S
Hinnüber, Josef 14-H, 308-M
Hinton, Christopher 226-A
Hintzpeter, U. 93-N
Hinxman, H. 381-G
Hipkins, H. J. 340-Q
Hirone, T. 5-P, 56-P
Hirsch, L. L. 385-M, 57-N
Hirsch, P. B. . . 215-M, 368-M, 1051-Q
Hirsch, Walter 438-R
Hirschfield, J. J. 115-S
Hirschmann, F. 383-K
Hirst, S. B. 172-E
Hirst, W. 341-M
Hisiguti, Ryukiti R. 18-N
Hislop, J. D. 107-S
Hixenbaug, Ralph 324-S
Ho, Teh-Hsuan 218-M
Hoak, Richard 59-A
Hoar, J. P. 380-P
Hoar, T. P. 670-L, 33-M, 333-R
Hoare, F. E. 121-P
Hoare, W. E. 624-K
Hobday, W. J. 272-L
Hoblit, F. M. 496-Q
Hobson, C. 640-L
Hobson, J. D. 230-Q
Hobson, R. A. 166-B, 88-C
Hobstetter, J. N. 257-N, 900-Q
Hoby, T. H. 11-D
Hoch, A. 390-L
Hochmann, J. 249-D, 64-N
Hodge, J. M. 103-Q
Hodge, P. G., Jr. 546-Q
Hodge, Webster 113-V
Hoenicke, Edward C. 389-E
Hoepli, Ulrico 24-E
Hoerni, J. 266-M
Hoersch, Albert, Jr. 139-T
Hofer, L. J. E. 132-P
Hoff, H. 61-F
Hoff, N. J. 426-Q, 719-Q
Hoffe, Hans von 151-K, 627-K
Höffler, Elfriede 215-R
Hoffman, G. H. 156-L
Hoffman, J. L. 251-S
Hoffman, Oscar 655-Q
Hoffman, R. E. 27-N
Hoffman, R. W. 206-P
Hoffmann, W. 364-K
Hofmann, J. A. 268-P
Hofmann, Wilhelm 99-C, 191-E, 99-K, ... 132-K, 252-K, 689-L, 218-M, ... 507-Q, 508-Q, 509-Q, 49-V
Hofstadter, Robert 101-P
Hogaboom, George B. . . . 39-L, 348-L
Hogaboom, G. B., Jr. . 36-L, 37-L, 39-L
Hogartz, Walter 493-R
Hohn, Francis H. 164-S
Hohn, Hans 473-R, 488-R
Holden, A. N. 90-M, 1032-Q
Holden, F. C. 77-M
Holden, H. A. . . . 252-F, 227-G, 615-L
Holden, Robert B. 43-C
Holdt, H. 530-Q
Holl, Hans 703-K
Holland, E. 188-L
Holland, L. 311-L, 152-N
Hollander, J. M. 331-P
Holleman, J. W. . . 219-J, 241-J, 106-L
Holleman, W. A. 219-J
Holley, C. H. 329-P
Holley, Charles E., Jr. 400-P
Hollomon, J. H. 131-N
Hollstrom, Stig 16-D
Holmes, J. M. 313-P
Holmquist, J. L. 26-F
Holstein, T. 48-P
Holt, J. P. 1-D
Holtz, J. C. 162-R
Holzhauer, Cl. 365-R
Homan, Ray E. 416-L
Honak, Eduard R. 487-Q
Honda, Kotaro 20-N
Hondrum, Olaf 60-B
Honebrink, R. W. 118-T
Hood, Harold C. 190-A, 17-F
Hood, J. E. 176-D
Hood, T. A. 50-L
Hooper, W. H. L. 625-Q, 94-S
Hoover, E. W. 381-R
Hoover, Helen D. 868-Q
Hoover, Morgan M. 440-Q
Hopkin, L. M. T. 41-N, 415-Q
Hopkins, A. D. 122-N
Hopkins, B. E. . . 82-Q, 513-Q, 164-R

Hopkins, H. G. 634-Q
Hopkins, J. W. 181-K
Hopper, Edward W. 430-R
Hoppmann, William H., II 590-Q
Hopwood, S. 312-K
Hörger, Hans H. 183-T
Horger, O. J. 832-Q
Hormann, E. 629-K
Horn, Elisabeth 133-M
Horn, F. Hubbard 13-M
Hornauer, H. 391-G
Hornbeck, J. A. 232-P
Horne, M. R. 220-Q, 807-Q
Hörnegren, C. 372-K
Horowitz, M. 23-P, 479-P
Horsley, R. 177-P
Horst, R. L. 278-R
Horstmann, Dietrich 518-L, 519-L, 307-M, 399-M, 275-R
Horvath, Zoltan 150-C
Horvay, G. 698-Q
Hosemann, R. 177-M
Hosie, D. 142-C
Hosken, William E. 158-S
Hospadaruk, V. 672-L
Hotchkiss, A. G. 127-J, 273-J
Hotchkiss, V. G. 240-G, 264-G
Hotop, W. 31-H
Houdremont, Eduard 146-N, 299-N, 996-Q
Houk, W. J. 148-M
Houldcroft, P. T. . 171-K, 207-K, 537-K
Houlden, B. T. 571-Q
Householder, R. G. 123-G
Houseman, D. H. 270-S
Hovenkamp, L. H. 912-Q
Hovey, L. A. 139-D
Hovorka, Frank 136-P
Howard, Darnley M. 256-Q
Howard, F. 90-R
Howard, J. C. 75-J
Howard, Louis N. 382-P
Howard, Robert T. 166-K
Howarth, E. S. 342-T
Howat, D. D. . . . 106-B, 126-D, 904-Q
Howe, Jerome W. 191-J
Howell, F. M. 572-Q
Howell, John F. 176-S
Howell, W. W. 83-A
Hoyes, J. 69-E
Hoyt, S. L. 282-A, 192-Q, 878-Q
Hron, H. G. 56-G
Hsu, Chieh Su 686-Q
Hu, L. W. 417-Q, 742-Q, 836-Q
Hubbard, Fred 198-D
Hubbard, Judson S. 108-B
Hubbard, William M. 6-P
Hubbell, F. P. 292-D
Hubbell, Wilson, G. 862-Q, 229-T
Huber, Elmer, J., Jr. 400-P
Huber, K. 155-L, 524-L, 115-R
Huber, Robert F. 197-F
Huber, R. W. 424-K
Hubert, Marcel 58-G
Hubert, Pierre 289-P
Hucke, Edward E. 579-K
Hucker, Günther 358-E
Hudak, N. M. 107-F
Huddleston, S. C. 342-T
Hudson, J. C. 663-L, 105-R, 143-R, 453-R
Hudspeth, W. R. 196-B
Huettig, G. F. 2-H
Huff, H. A., Jr. 330-K, 483-K
Hug, H. 460-Q, 23-V
Hughes, Evan E. 33-B, 64-B, 112-B, 113-B, 166-B
Hughes, H. V. 195-B
Hughes, M. L. 630-L, 708-L
Hughes, Philip J. 793-Q
Hughes, W. 160-M
Hugony, E. 262-T
Hugus, Z. Z., Jr. 36-P
Huizenga, D. I. 136-E
Huizenga, J. R. 228-P
Hukki, R. T. 170-B
Hulbert, C. C. 294-R, 378-R
Hull, F. C. 148-M
Hull, R. O. 37-L, 40-L
Hull, W. G. 537-K, 699-K
Hulme, Philip M. 178-E
Hultgren, A. 271-J
Hultgren, Ralph 967-Q
Hum, Jack K. Y. 124-M
Humenik, M., Jr. 139-P
Hume-Rothery, W. 25-M, 108-M, 282-M
Hummitzsch, W. 109-K, 244-K
Humphrey, D. W. 226-T, 347-T
Humphrey, Robert 72-K
Humphrey, W. S., Jr. 217-L
Humphreys, I. B. 108-B
Hund, F. 16-H, 37-H
Hundy, B. B. 99-Q, 414-Q, 976-Q
Hunnicutt, Horace A. 952-Q
Hunsaker, O. K. 81-S
Hunsinger, Walter 312-S, 323-S
Hunt, B. G. 44-C
Hunt, J. R. 905-Q
Hunt, K. L. 88-P
Hunt, S. E. 184-P
Hunter, John 277-E
Hunter, M. A. 41-A
Hunter, M. S. 175-M, 342-M
Huntington, H. B. 382-M, 308-N
Hurford, W. J. 163-F

Hurry, James A. 955-Q
Hurst, H. J. 186-E
Husmann, Hans-Jochen . . 99-K, 132-K
Husson, G. 346-D
Huston, Wilber B. 916-Q
Hutchinson, E. F. 192-F, 200-J
Hutchison, D. M. 365-L
Hutchison, J. S. 310-R
Hutchison, T. S. 258-M, 183-N
Hutt, G. M. 152-S
Hutter, Leo 624-E, 430-M, 231-N
Hüttig, G. F. 145-B, 33-H, 97-H
Huttl, J. B. 59-B, 127-B
Huxley, H. E. 263-M
Hyder, Mohammed S. 66-N
Hyler, John E. . . 199-J, 214-J, 174-J, . . 114-L, 326-L, 438-L, 512-L, 698-L
Hyler, W. S. 217-Q, 572-Q
Hyslop, Marjorie R. 82-A

I

Iakovleva, M. E. 584-L
Iarovinskii, L. M. 322-K
Iavaoiskii, V. I. 58-P
Ichida, Masakazu 510-E
Ignatyeva, S. I. 381-M
Iguchi, Nobuhiro 248-N
Ihrig, Harry K. 1024-Q
Iitaka, Ichiro . . . 507-E, 246-N, 840-Q
Il'ina, V. A. 19-M, 777-Q
Il'iushin, A. A. 129-F
Illig, W. 342-S
Illing, Fritz 374-K
Ilschner, M. 336-M
Imhoff, Robert N. 303-Q, 850-Q
Ince, C. R. 66-A
Inouye, Henry 154-B
Intrater, J. 156-N
Inukai, Takeshi 838-Q
Iofa, Z. A. 92-Q
Irani, M. C. 100-V
Irish, Carolyn R. 136-M
Irwin, Bruce 195-B
Irwin, E. A. 53-F
Irwin, G. R. 638-Q
Irwin, J. T. 485-L
Isaacs, Griffin L. 90-F
Isayev, A. I. 114-G
Isbell, Dwight E. 100-T
Isenburger, Herbert R. 201-S
Ishiguro, Kozo 220-S
Ishihara, Yoshio 35-S
Ison, H. C. K. 179-R, 337-R
Itzel, Morris 1049-Q, 381-S
Iuktanov, D. M. 80-B
Iungelson, B. G. 323-K
Iunikov, B. A. 272-N
Iuza, V. A. 213-B
Ivanick, W. 27-H
Ivanova, V. S. 817-Q
Ivanovskaia, S. I. 272-N, 317-N
Iya, Vasudeva Kilara 83-C
Izuzquiza, Mariano 131-K, 380-S

J

Jack, Peter S. 136-B
Jacklin, C. 308-R
Jackman, Everett 12-G
Jackson, A. 144-S
Jackson, Clarence E. 270-K
Jackson, David H. 98-R
Jackson, Howard E. . . . . . 18-G, 53-G, 99-G, 253-G, 272-G, . . . 349-G, 350-G, 14-J, 581-K, 66-T
Jackson, J. H. . .118-E, 303-E, 227-J, 80-R, 123-R, 385-R, 386-R, 387-R, 67-T
Jackson, J. O. 332-L
Jackson, K. 127-T
Jackson, K. A. 220-N, 876-Q
Jackson, R. S. 546-E, 614-E
Jacob, L. 165-M
Jacobs, F. W. 300-E
Jacobs, James A. 237-P, 223-S
Jacobsen, Lydik S. 686-Q
Jacobsmeyer, L. 459-K
Jacobson, H. J. 135-E
Jacobson, M. I. 269-K
Jacqué, Léon 190-M, 73-N
Jacquet, P. A. 34-M, 128-M, 366-M, 433-R, 17-S
Jaeger, H. E. 518-K
Jaffe, L. D. 265-J, 671-Q, 891-Q, 980-Q
Jaffe, R. I. . . . . 30-H, 81-J, 8-M, ...75-M, 76-M, 77-M, 168-Q, 5-T
Jahn, A. P. 403-R
Jahn, Heinz 212-B
Jahnle, H. A. 1008-Q
Jain, S. C. 17-P, 70-P, 341-P
Jakoby, Laszlo 137-C, 223-F
Jamar, F. 290-G
James, J. A. 123-M
James, N. R. 22-P
James, R. W. 206-M
James, W. A. 652-L
Jameson, A. S. 204-J
Jamieson, R. B. 8-D, 224-S
Jamilkowski, V. 193-G
Jamison, R. S. 66-J
Jan, J. P. 72-P
Jangg, G. 190-S
Jäniche, W. 153-Q, 764-Q
Jansana, Luis 449-R

Jansen, Klaus 299-N
Jantsch, G. 129-C
Janvier, J. 36-D
Jaques, T. A. J. 217-S
Jaramillo, Roberto 341-D
Jarman, John T. 1024-Q
Jarvis, E. 233-D
Jason, A. C. 100-P
Jasper, N. H. 584-Q
Jaudon, Emile 182-S
Jaumann, J. 216-P
Jefferson, T. B. . . 418-K, 532-K, 615-K
Jegaden, G. 312-L
Jelley, R. 303-D
Jellig, Walter 244-G
Jellinghaus, Werner . . . . . .
. . 427-M, 46-N, 299-N, 308-P, 403-S
Jenitschek, Peter 431-M
Jenkins, A. E. 14-R
Jenkins, C. H. M. 851-Q
Jenkins, I. 1051-Q
Jenkins, Lyle 256-S
Jenkins, R. O. 127-T
Jenkins, Robert 174-K
Jenkinson, E. A. 23-Q
Jennings, J. 568-Q
Jenny, H. 506-Q
Jensen, Knud E. 319-D
Jensen, N. H. 96-A
Jensen, R. S. 87-S
Jensen, W. L. 358-S
Jeppesen, O. Gram 144-P
Jernstedt, George W. 38-L
Jeromson, J. R. 383-Q
Jessop, H. T. 93-Q
Jessup, A. C. 565-C
Jetter, L. K. 197-M
Jevons, J. D. 94-A
Jewart, Charles N. 30-D, 208-D
Jewell, R. C. 41-S
Jewell, W. R. 181-Q
Jillson, D. C. 895-Q
Joel, N. 264-M
Joga Rao, C. V. 661-Q, 662-Q
Johannsen, Friedrich . . . . . .
. . . . . 309-A, 185-D, 318-D
Johansen, E. K. 226-G
Johansen, H. A. 52-F
John, E. R. 230-P
Johnsen, R. O. 696-K
Johnson, A. C. 270-P
Johnson, A. E. . . . . .
. . . 37-Q, 51-Q, 130-Q, 222-Q, 621-Q
Johnson, A. G. 63-B
Johnson, A. J. 54-Q
Johnson, A. L. 22-K
Johnson, E. 270-L, 444-L, 553-L, 194-T
Johnson, Gordon W. 204-Q
Johnson, H. A. 454-P
Johnson, H. H. 233-S
Johnson, J. E. 865-Q
Johnson, Lawrence H. 1-H
Johnson, N. R. 250-P
Johnson, Otto H. 10-V
Johnson, Rankin, Jr. 885-Q
Johnson, R. D. 3-N, 791-Q
Johnson, William R. 40-V
Johnson, W. H. 294-E
Johnson, W. N. 379-P
Johnston, B. G. . . . . .
. . . . . 59-Q, 484-Q, 485-Q, 709-Q
Johnston, Herrick L. 133-P, 310-P, 399-P
Johnston, P. M. 119-M
Johnstone, S. T. M. 36-S
Jominy, Walter E. 207-J, 824-Q
Jones, A. 91-M
Jones, B. 303-D
Jones, Claude K. 211-M
Jones, D. J. 21-H
Jones, E. L. 34-N
Jones, Elizabeth 325-L
Jones, E. R. W. 562-Q
Jones, G. O. 150-P
Jones, H. 360-M
Jones, H. O. 580-L
Jones, I. 382-K
Jones, J. F. R. 205-F
Jones, John W. 274-P
Jones, L. G. 551-L, 297-R
Jones, M. H. 874-Q
Jones, O. A. 182-B
Jones, Rodney A. 242-L
Jones, T. B. 120-K, 229-K
Jones, T. S. 113-N
Jones, Vernon W. 143-D, 241-D
Jones, W. E. 541-Q
Jones, W. M. 184-P
Jones, W. P. 120-T
Jones, W. R. D. 13-P, 477-Q
Jongenburger, P. 325-P
Jonker, G. H. 440-P
Jordan, S. K. 111-L
Josefsson, Ake 649-Q
Joseph, James. 195-A, 54-V
Joukainen, Arnold S. 62-M
Joumat, P. 542-K
Jouty, Roger 495-P
Jowett, G. H. 7-E, 265-E
Judge, J. D. 70-A
Juhnke, E. C. 93-B
Julien, Carl A. 198-M, 419-M
Jung, Erwin Pierre 291-S

Jung, P. J. 601-Q
Jung, R. L. 328-D
Jungbluth, Hans . . 45-N, 457-E, 602-E
Junius, Hans Martin 91-J
Jurczyk, Karl 688-K
Jurden, Wilbur 19-B
Juretzek, Hubert 463-Q
Jurgensonn, Helmut von 958-Q

K

Kaestle, F. L. 113-C
Kahl, W. H. 167-D
Kahler, Floyd H. 399-L
Kahles, John F. . . 78-G, 407-G, 418-M
Kahlhofer, Heinrich 348-D
Kahn, M. D. 306-R
Kaiser, Josef 462-Q
Kaiser, Oscar W. 198-F
Kaizik, K. 320-T
Kakhovskii, N. I. 498-K
Kalish, Herbert S. 23-H
Kalish, Paul J. 48-R
Kalischer, P. R. 53-H, 123-H
Kallenbach, Helmut 185-F
Kalling, Bo 322-D
Kalpers, H. 374-L
Kammer, V. D. 391-L
Kammerer, A. 438-Q
Kane, John M. 108-A
Kaneda, Yoshio 31-R
Kangro, Cl. 467-P
Kantz, Asher 101-P
Kanzaki, Hiroshi 559-Q
Kapitan, Josef S. 179-D
Kaplan, H. 171-P
Kappel, Victor 8-J
Kapustin, A. P. 148-R
Karaev, R. I. 266-D
Karasev, N. A. 191-N, 783-Q
Karasev, R. A. 432-P
Karasik, G. A. 398-G
Karian, George 6-H
Karle, J. 321-M
Karlson, N. 16-M
Karlsson, Hilmer 304-R, 485-R
Karlsson, Nils 121-M
Karmazin, V. I. 213-B
Karnauchova, N. M. 522-L
Karnaukhov, M. M. 451-P
Karpenko, G. V. 780-Q
Karry, R. W. 866-Q
Karsay, Istvan 480-E, 575-E
Kashima, Jiro 513-E, 515-E
Kastan, Howard 246-F
Kastner, J. 358-P
Katz, L. 174-P, 175-P, 249-P
Katz, Walter 141-N, 234-R
Kauffman, W. W. 308-S
Kaufman, George A. 279-F
Kaufman, Hershel E. 19-D
Kaufman, W. J. 289-S
Kaufmann, A. R. . . 6-C, 174-N, 201-P
Kaufmann, D. W. 479-Q
Kauhausen, Egon 80-K
Kawada, Tomoyoshi 65-Q
Kawamura, Tukasa 73-L
Kaya, Seiji 191-P
Kayama, Nobutaro 509-E, 510-E
Kayse, James R. 194-A
Kazakova, V. A. 369-R
Kazarnovskii, D. S. 207-N
Kazennov, Iu. I. 277-K
Keane, A. 676-Q
Keating, F. H. 415-K, 706-K
Keating, Ken 202-R
Keck, David R. 72-R
Keck, Paul H. . . . 118-N, 153-N, 457-P
Keeble, H. W. 27-K
Keech, Gordon 114-E
Keegan, T. F. 245-J
Keel, C. G. 184-G, 251-K, 316-K, 399-K, 762-Q
Keeler, J. H. 53-P, 535-Q
Keesom, P. H. 18-P, 501-P
Keffer, F. 171-P
Kehl, George L. 267-M
Kehrer, Victor J. 103-N
Keil, Albert 118-H, 291-P, 413-Q, 199-T
Keller, F. 342-M
Keller, G. 492-E
Keller, H. 723-L
Kellner, H. L. 35-L
Kellner, L. 512-P
Kellner, M. J. 634-E
Kellogg, H. H. 259-P
Kelly, A. 215-M, 372-Q, 748-Q
Kelly, F. M. 65-P
Kelly, H. J. 43-B
Kelly, J. M. 405-P, 100-T
Kelly, John D. 352-K
Kelly, J. W. 164-N
Kelly, R. R. 619-L
Kelso, John 196-A
Kemana, Erich 205-A
Kember, N. F. 281-A
Kemp, C. Ridgely 197-K
Kempe, R. A. 343-E
Kemper, H. 650-L, 1018-Q
Kendall, V. V. 382-R
Kennard, E. H. 444-Q
Kennedy, A. J. 481-Q, 561-Q, 678-Q, 875-Q
Kennedy, C. W. 16-S, 269-S

Kennedy, J. D. 105-H
Kennedy, R. C. 160-L
Kennicott, W. L. 131-G, 428-Q
Kentzler, H. 162-T
Kenworthy, H. 233-B
Kenyon, A. F. 83-F, 172-F
Kenyon, J. 286-M
Kern, H. E. 24-N
Kerr, Richard E. 255-D
Kerr, William R. 102-B
Kerschagl, Richard 78-V
Kershner, K. K. 233-B
Kessler, H. 580-E, 435-R, 268-T
Kessler, H. D. . . . . 131-C, 173-M, ... 353-M, 274-N, 275-N, 73-V
Kessler, Robert L. 188-F
Keste, S. 649-L
Ketcham, Sara J. 693-L, 21-R
Ketter, Robert L. 59-Q
Keuhnel, Reinhold 563-K
Keuleyan, Leonce 253-T
Keutmann, Josef 91-J
Kevane, C. J. 502-P
Keverian, Jack 145-E, 182-N
Keyser, N. H. 74-A
Kharoshev, I. I. 782-Q
Kheynman, A. S. 318-L
Khrobastov, M. F. 590-K
Khrushchov, M. M. 919-Q
Kiefer, G. C. 7-R, 135-R, 452-R
Kiefer, R. 2-H
Kieffer, R. 144-M, 309-M, 310-M, 237-N, 34-V
Kiehl, J. P. 238-N
Kienberger, J. P. 115-K
Kiessel, W. R. 174-Q
Kiessler, H. 133-C, 221-J
Kiessling, R. 2-H, 239-N
Kiley, Henry E. 25-E
Kilgour, M. R. 258-K
Killaby, P. J. 2-E
Killing, E. 54-D
Killing, H. 369-K, 627-K
Kimball, Clyde 371-P
Kimball, Robert W. 117-F
Kimmel, Robert T. 359-L
Kimura, Yasuo 18-N
Kimura, Yasuyuki 613-L
King, A. J. 219-N
King, A. R. 69-L
King, J. A. 41-G
King, M. C. 273-L
King, T. B. 96-B
Kingcome, John C. 161-L
Kingery, W. D. 139-P
Kingswood, V. S. 228-B
Kington, G. L. 313-P
Kinney, L. C. 717-L
Kinney, S. P. 216-D
Kinnumen, Jorma 112-S
Kinsey, B. B. 86-P, 87-P, 403-P
Kinsey, H. V. 35-Q, 73-Q, 96-V
Kinter, Sutton 130-L
Kinzel, Augustus B. 84-M
Kip, Arthur F. 203-P, 368-P
Kirby, H. W. 910-Q
Kirchgessner, W. G. 201-M
Kirchner, Englebert 6-F
Kirillov, W. I. 318-L
Kirkby, H. W. 123-Q, 852-Q
Kirkpatrick, H. B. 436-L
Kirshenbaum, A. D. 169-S
Kiselev, G. I. 778-Q
Kitchener, J. A. 41-P, 151-P
Kittel, C. 24-P, 368-P, 396-P
Kjerrman, Bengl 40-D
Klain, Paul 116-K, 209-K
Klapheck, Wilhelm 371-K
Klas, Heinrich 439-R, 493-R
Klauber, P. M. 145-L
Klein, Hans 198-S
Klein, Myron W. 53-N
Klein, O. 96-P
Kleinschmidt, B. 61-G
Klemantaski, S. 270-D
Klement, J. F. 72-T
Klemm, Alfred 305-N, 306-N
Kleppa, O. J. 37-P, 38-P
Kling, A. G. 426-L
Klingler, L. J. 968-Q, 992-Q
Klinkenberg, Werner 1042-Q
Klinker, H. L. 215-D
Klinker, L. G. 581-E
Klinov, I. Ya. 240-R
Klosse, E. 56-K, 546-K, 276-R
Klotter, K. 691-Q
Kluge, M. 336-M
Knappwost, A. 76-P, 123-P
Knerr, Horace C. 211-J
Knez, Leo 43-K
Knibbs, Fred H. 726-L
Knibbs, N. V. S. 110-B
Knierim, C. O. 251-J
Knight, A. 336-Q
Knight, C. 6-T
Knight, D. E. 593-K
Knight, D. L. 116-K, 158-K
Knipp, E. 651-E
Knizhnik, Z. B. 501-K
Knopp, W. V. 54-H
Knowles, E. J. 41-S
Knowlton, Harry B. 385-Q
Knox, John D. 15-F
Knudsen, John F. 150-B

Knudsen, K. E. 485-Q
Knüppel, Helmut . . 15-D, 374-D, 464-Q
Ko, T. . . 52-J, 5-N, 80-N, 91-N, 224-N
Kob, J. 51-G
Kobayashi, Takeo 55-P
Kobayashi, Takuro 595-K
Kober, Hermann 73-P
Koch, B. F. 19-B
Koch, H. 125-K, 505-Q
Koch, J. J. 957-Q
Koch, L. 517-L, 649-L, 315-N
Kochendorfer, A. 801-Q
Kock, R. M. 342-T
Koehler, J. S. 449-Q, 502-Q, 1033-Q, 1034-Q
Koenig, Robert F. 392-R
Koenigsberger, F. . . 329-K, 448-K, 454-K, 503-K, 633-K, 991-Q, 1023-Q
Koester, H. F. 275-L
Koester, L. 505-P
Kofler, A. 313-M
Koh, P. K. 62-N
Kohanowski, N. N. 62-B
Kohl, Jerome 367-S
Kohl, Wilfried 149-A
Köhler, Th. G. 643-Q
Kohlmeyer, Ernst-Justus 8-C
Kohman, Truman P. 274-P
Kohn, A. 129-M, 212-S, 397-S
Kolb, E. D. 189-N
Kolb, W. 243-S
Kolevatova, V. S. 393-P
Kollmar, A. 196-T, 318-T
Kollmar, M. 534-L
Kolodin, M. V. 438-P
Komai, Yoshio 98-S
Komarovskii, A. G. 108-S
Kompfner, R. 512-P
Komusaari, H. 102-L
Kondic, V. 47-C, 72-C, 640-E
Kononenko, V. G. 632-K
Konrad, Erich 100-D
Konschak, M. 664-K
Kontorovich, I. E. 192-N
Koonce, S. Eloise 101-N
Koopman, K. H. . . . 92-K, 114-K, 164-K
Kootshma, L. K. 114-G
Kootz, Theo 276-D
Kopec, R. 645-L
Kopelman, Bernard 88-A, 43-C
Koppe, Rolf 99-K, 132-K
Koppenberg, Heinrich 362-D
Korbelak, A. 628-L
Korecky, Jan 315-T
Kornakov, M. 460-E
Korndorffer, A. 31-N
Kornilov, I. I. 110-M, 137-M, 275-M, 15-N, 436-P, 909-Q
Körös, Bela 433-E, 479-E, 484-E, 627-E
Korringa, J. 443-P
Kortum, Gustav 376-M
Koshkin, N. 268-J
Köster, Werner . . 133-M, 96-N, 179-N
Koster, William P. 418-M
Kosters, Franz 255-J
Kostoch, F. Robert 190-T, 73-V
Kostron, Hans 130-M, 229-M, 37-N, 117-Q, 215-R
Koth, A. W. 162-R
Kothen, Charles W. 399-P
Kotov, A. G. 394-P
Kottcamp, C. F. 169-D
Kottmann, Alfons 177-N
Kouwenhoven, W. B. 229-K
Kovacs, Andre 144-Q, 145-Q
Kovalev, A. E. 776-Q
Kowalkowski, Hans 660-K
Kozacks, J. S. 343-T
Kozmanov, Yu. D. 381-M
Krach, F. G. 319-E
Krachter, Hans . . 196-N, 189-S, 391-S
Kraemer, Franz 196-N
Krafack, Karla 474-R
Kraichik, M. M. 495-K
Krainer, E. 153-J, 282-K, 311-S
Krainer, Helmut 153-J, 95-N, 300-N, 294-Q, 531-Q, 615-Q, 311-S
Kramer, H. 59-H
Kramer, Kurt 370-E
Kraner, Hobert M. 30-D, 149-D, 208-D, 124-E
Kranz, Paul J. 60-C
Krasnov, N. T. 785-Q
Krause, A. 215-D
Krause, D. E. 144-E
Krause, H. 56-L
Kraushaar, J. J. 322-P
Krautkramer, H. 391-S
Krautkrämer, Josef . . . 250-S, 391-S
Krebs, E. 288-A, 352-D
Krebs, Heinz 245-N
Krebs, W. E. 52-D
Krebs, W. W. 223-D
Krekeler, K. 391-K
Kreshtshanovsky, N. S. . . 246-D, 556-E
Kreutzer, C. 297-D
Krianin, I. R. 322-K
Krieger, Robert J. 68-K
Kriessman, C. J. 195-P
Kriewall, W. B. 643-K
Krijff, A. P. 683-K, 237-Q
Krippendorff, H. 497-E
Krisch, Alfred . . 463-Q, 1020-Q, 1041-Q
Krisement, Otto 146-N, 616-Q
Krishnan, K. S. . . . 17-P, 70-P, 341-P
Kristinsson, H. B. 306-R

Kritskaia, V. K. 19-M, 777-Q
Kriz, M. A. 66-A
Kroll, W. J. . . .13-B, 2-C, 148-C, 87-H
Krombholz, A. J. 97-A
Kröncke, G. 290-P
Kroneis, Max . . . 95-N, 300-N, 294-Q
Kroner, A. M. 140-D
Kronqvist, Ebbe 95-P
Kronsbein, John 550-L
Kronstein, Max 68-L
Kropka, Joseph G. 166-E
Krug, Carl 319-L
Kruger, Alfred 29-Q
Kruger, Paul 236-P
Krumme, Walter 305-A
Krupnik, N. 665-Q
Kruschwitz, Henry W., Jr. 57-M
Kruse, Walter 255-F
Krustenstjern, Arvid v. 735-L
Krynitsky, A. I. 304-E
Krystof, J. 526-Q
Krystyan, K. J. 312-Q
Kubaschewski, O. . 309-P, 348-P, 164-R
Kubyshkina, T. D. 107-N
Kudar, J. 373-Q
Kudriavtsev, N. T. 139-C
Kuhl, Willi 112-M
Kuhlmann-Wilsdorf, Doris 299-M, 293-Q, 295-Q
Kuhn, Paul 572-Q
Kuhn, Robert J. 41-R
Kuhn, W. E. 43-E
Kuhnel, R. 1016-Q, 290-T, 328-T
Kühr, C. A. H. von Wolzogen . . . 83-R
Kuivinen, T. O. 397-Q
Kukaczka, R. 395-L, 526-Q
Kula, Eric 284-N
Kulin, P. A. 6-C
Kulin, S. A. 172-N, 173-N
Kulman, Frank E. 46-R
Kulpaca, R. L. 92-C
Kumar, S. 662-Q
Kundu, D. N. 234-P
Kunz, F. W. 1032-Q
Kunz, Hans 223-J, 128-K
Kunze, E. 138-M, 30-Q
Kunze, Keith 58-B
Kuo, Kehsin . . . . . 159-M, 401-M, ... 402-M, 423-M, 162-N, 211-N
Kura, J. G. 118-E, 303-E, 504-E
Kuralt, R. M. 19-B
Kurdyumov, G. V. 88-J, 19-M, 81-N, 209-N
Kurochkin, K. T. 58-P
Kurovszky, Istvan 397-L
Kurshan, J. 481-P
Kurtepov, M. M. 351-R, 395-R
Kusakawa, Takaji 511-E
Kuske, Albrecht 127-Q
Kussmann, A. 198-G
Kutar, Phiroz 147-B
Kutter, Fritz 146-T
Kutuchief, I. 170-K
Kutzelnigg, Artur 736-L, 187-S
Kuwabara, Goro 220-S
Kuwada, Kenji 33-D
Kuzema, I. 49-F
Kuznetsov, A. N. 213-B
Kwolek, John 92-G
Kyle, P. E. 119-E

L

Labhart, Heinrich 215-P
LaChance, M. H. 30-H
Lackner, O. E. 323-E
Lacombe, J. de 159-Q
Lacombe, P. 349-Q, 803-Q, 27-R
LaCorte, Andrew 181-S
Lacour, Hans-Reiner 465-Q
Laffly, E. G. 241-S
Lafon, J. E. 236-D, 281-D, 283-D
Laiderman, D. D. 374-R
Laidler, D. S. 303-T
Laister, E. H. 705-L
Lake, R. L. 516-Q, 582-Q, 704-Q
Lakshminarayana, C. N. 394-Q
Lal, H. 490-P
Lamb, Frank D. 75-B
Lamb, John 184-R
Lamb, Vernon A. 608-L
Lambert, J. R. 76-C
Lambert, R. 494-E
Lambert, R. A. 172-D, 306-D
Lambot, Honore' 146-Q
Lami, Albert 254-D, 304-D
Lamm, F. 411-E
Lamont, John L. 405-M
Lamourdedieu, Marcel 220-F
Lamy, P. 209-A, 274-A
Lanahan, Thomas B. 158-S
Lanari, Amaro, Jr. 336-D
Lancaster, E. A. 497-L
Lancaster, J. F. 7-K, 602-K
Lander, J. J. 24-N
Landergren, U. 270-J
Landers, Charles B. . . .572-Q, 1012-Q
Landis, G. N. 417-E
Landis, Harvey 228-E
Landwehr, Rudolf 96-S
Lane, I. Roy, Jr. 159-R, 198-R
Lane, J. R. 424-K, 975-Q
Laneuville, Jean 223-B
Lang, A. H. 192-A

Lang, Philip 197-R
Lang, R. M. 303-E
Lang, R. S. 58-C
Lange, E. 255-R
Lange, E. A. 281-E
Lange, F. 629-E
Lange, Hansheinz 533-Q
Lange, K. 210-F, 540-K
Lange-Eichholz, K. H. 37-C
Langenberg, F. C. 57-E
Langer, A. 546-L
Langer, L. M. 386-P
Langers, R. 183-Q
Langford, D. A. 347-M
Langhaar, H. L. 196-Q
Langhammer, A. J. . . 32-H, 52-H, 88-H
Langner, Walter 41-C
Langston, Benny 121-B
Langton, N. H. 295-P
Langum, Bjorn 156-E
Lankford, W. T. 103-Q
Lansing, James H. 219-E, 523-E
L'anson, J. E. 59-E
Lanze, W. 260-T
Lanzl, L. H. 222-S
Lapitskaia, E. M. 238-R
Lapsely, J. T., Jr. 21-G
Lapidus, V. A. 322-K
LaQue, F. L. 104-R, 269-R, 312-R, 323-R
Lardner, E. 110-J
Lardy, Hans 350-D
Lark-Horovitz, K. 18-P, 279-P
Larke, Eustace C. 271-F
LaRou, L. V. 171-L, 358-L
Larrabee, C. P. 373-R
Larsen, Edwin M. 68-C
Larson, Edward W., Jr. 11-Q, 869-Q, 1001-Q
Larson, E. Victor 49-S
Larson, F. R. 276-N
Larson, Hugo 309-D
Lasch, H. W. 128-L
Lashko, N. F. 316-N
Latham, Charles W. . . . 124-T, 133-T
Latin, A. 623-Q
Latour, Alfred 204-D, 211-D
Lattey, R. 324-T
Laudig, J. J. 117-S
Laughner, E. M. 3-K
Laurent, P. 83-H, 144-Q, 145-Q
LaVelle, D. L. 69-N, 242-Q
Lavender, J. D. 171-N
Lavigne, M. J. 422-R
Lawrance, R. 185-P
Lawrence, B. G. 219-S
Lawrence, J. S., Jr. 300-E
Lawrence, R. F. 87-D
Lawrie, W. B. 529-E, 45-G, 406-G
Layne, E. E. 470-Q
Layton, D. N. 283-L
Layton, Michael 273-A
Lazan, B. J. 549-Q, 873-Q
Lazarev, V. P. 33-Q, 272-Q
Lazarus, D. 25-N
Leadbeater, A. W. 8-D
Leak, G. M. 4-N
Lebed, D. P. 491-K
Le Bihan, Pierre 256-T
LeBlanc, J. M. . . 255-M, 266-P, 321-P
LeBlanc, L. J. 377-E
Lebre, R. 252-T
Lebrun, M. 347-K
Leckie, A. H. 34-D
LeClaire, A. D. 212-N, 221-N
Leclerc 124-D
Leder, Georg 184-F
Lederer, M. 166-S
Ledford, Raymond F. 34-L
Ledgard, A. T. 366-D
Leduc, O. 387-K
Lee, Charles B. 337-E
Lee, Charles E. 118-L
Lee, E. H. . . . . .321-Q, 322-Q, . . 323-Q, 324-Q, 325-Q, 733-Q, 737-Q
Lee, E. W. 71-P, 418-P
Lee, F. W. M. 215-S, 328-S
Lee, G. W. 45-B
Lee, Melvin M. 29-K
Lee, Richard K. 642-K, 680-K
Lee-Bird, D. H. 43-F
Leedy, R. M. 81-T
Lees, D. C. G. 675-Q, 303-T
Lefebvre, Achille G. 76-D
Lefever, Robert A. 406-M
Lefevre, M. 271-Q
Legendre, M. 235-D
LeGrand, Rupert 34-F, 1-G, 2-G
Legvold, S. . . 22-P, 196-P, 384-P, 502-P
Lehfeldt, W. 226-S
Lehmann, O. H. 90-T
Lehovec, K. 143-N
Leidheiser, Henry, Jr. 103-N
Leighly, H. P. . . . 30-N, 154-N, 22-Q
Leiris, Henri de 112-Q, 291-Q, 355-Q, 996-Q
Leisen, P. J. 252-A
Lelong, P. 349-Q, 803-Q
Lemcke, Gustav 276-F
Lement, B. S. 115-N, 281-N
Lemmlein, G. G. 379-M
Lemoine, J. 271-Q
Lena, A. J. 452-R

Lenbridge, J. 402-G
Lenel, F. V. 2-H, 84-H, 110-H
Lengbridge, John W. . . . 133-G, 286-G
Lenning, G. A. 8-M
Lennon, F. J., Jr. 17-H, 598-K
Lennon, J. H. 91-M
Lenven, M. M. 705-Q
Leo, R. 124-S
Leonard, C. D. 594-L
Leonard, Robert W. 253-Q
Leone, Otto J. 129-D
Leone, William C. 136-Q
Leonelli, Bruno 37-L
Leonhardt, Fritz 97-T
Leontis, T. E. 220-E
Lepeu, H. 227-K
Lepp, Henry 122-E
Lerouge, G. 720-L, 730-L
Le Roux, R. 268-N, 298-N
Leroy, A. 386-K
Leroy, P. 88-D, 125-D, 286-D, 370-D, 373-D
Lesage, M. 165-F
Lescop, Pierre 44-N
Leslie, W. C. 214-N, 287-N
Lesnewich, Alexander 577-K
Lesser, Milton A. 9-L
Lessing, Lawrence P. 20-A
Lethen, R. 310-D, 458-E
Letner, Harold R. 599-Q, 619-Q
Leufven, A. 200-F
Levaux, J. 36-D
Leveille, Rene 42-K
Levelton, Bruce 76-R
Leven, M. M. 422-Q
Levi, F. 377-Q
Levin, A. I. 393-P
Levin, L. Ross 790-Q
Levine, A. 51-K
Levinger, B. W. 70-M, 71-M
Levinson, David W. 213-M
Levy, S. L. 39-P, 198-P
Lew, Hin 164-M
Lewis, Charles F. 50-R
Lewis, Elliot L. . . . 620-E, 213-T, 299-T
Lewis, Floyd A. . . . 73-E, 216-E, 266-T
Lewis, F. M. 107-B
Lewis, K. G. 47-G, 115-G, 205-G, 259-G
Lewis, R. T. 162-A
Lewis, W. R. 490-L
Leyensetter, W. 6-G
Li, Choh Hsien 110-N, 898-Q
Li, Yin-Yuan 752-Q
Liakhovetskaia, E. I. 92-Q
Liber, M. I. 278-K, 494-K
Libove, Charles 792-Q
Libsch, J. F. 8-H, 57-J, 122-J, 175-Q
Lidman, W. G. 133-N
Liebaut, A. 174-S
Liebhafsky, H. A. 132-R
Liebing, O. 163-T
Lieblich Joseph H. 32-R
Liebson, S. H. 144-N
Lieby, Gustav 652-E
Lieser, Karl Heinz 53-M
Lietzke, M. H. 154-C
Liger, J. 195-L, 201-L, 529-L
Lihl, Franz 109-C, 166-F, 71-H, 431-M, 306-P, 486-P, 293-Q
Likhter, A. I. 497-P
Likhtman, V. I. 241-N
Lilienfeld, J. E. 257-P
Lilker, Jay 676-L
Lillieqvist, G. A. 111-E, 204-Q
Lillys, Peter 283-N
Limbach, Lawrence M. 258-G
Limbrock, J. W. 113-L
Limpach, S. A. 235-F
Lim Poy, George 353-L
Lin, S. T. 201-P
Lin, Tung H. 723-Q
Lincoln, R. A. 402-Q, 88-T
Linde, J. O. 85-P
Lindeskog, Bertil 12-J
Lindgren, G. 579-E
Lindh, Gunnar 24-V
Lindhard, J. 476-P
Lindim, L. G. 348-R
Lindqvist, H. 390-G
Lindsay, H. W. 690-K
Lindsay, R. W. . . 416-M, 209-Q, 682-Q
Line, André 119-L
Linek, A. 59-G, 256-G
Linford, Henry B. . 214-L, 366-L, 549-L
Linicus, W. 322-T
Link, Hans 199-A
Linsley, H. E. 401-G
Lippert, T. W. 232-G
Lips, E. M. H. 42-G
Lipson, S. 284-E, 339-E
Lismer, R. E. 39-M
Lisner, Otto 461-Q
Liss, R. B. 251-M
Lissell, E. O. 625-E, 1049-Q
Lissner, Morton 119-A
Lister, R. P. 231-E
Little, Arthur 19-H
Little, R. N., Jr. 324-P
Liu, Chang Kong 543-Q
Liu, S. I. 100-Q
Liu, You Chao 129-N, 130-N
Liukevich, D. A. 632-K
Lloyd, C. C. 482-R
Lloyd, D. H. 639-L

Loach, W. J. 409-M
Lochen, R. E. 386-Q
Lockerbie, I. 93-D
Lodovico, Sam 144-L
Locquin, R. 41-H
Loebich, Otto 298-L, 325-T
Loevenstein, Hirsch 68-A
Loewer, A. C., Jr. 310-Q
Logan, J. A. 27-G
Logan, John K. 45-P
Logan, R. A. 461-P
Logeling, M. 219-D
Logozzo, Arthur 36-L
Löhberg, Karl 258-E, 137-Q
Loizou, N. 795-Q
Lomas, J. . 46-C, 39-J, 238-J, 314-P, . 263-R, 71-S, 33-T, 271-T, 21-V, 55-V
Lombard, W. K. 197-J
Lommer, W. M. 53-Q
Long, John V. 483-L
Long, Roger A. 250-N, 306-Q
Longaretti, Carlo 116-E, 206-N
Longenecker, Charles 48-B
Longuet-Escard, Jacqueline . . . 227-M
Lonsbury, Pierre B. 622-L
Lonsdale, Kathleen 145-M
Lonskii, E. D. 492-K, 772-Q
Loo, M. van 128-L
Loorz, W. 110-S
Loper, Carl R. 100-E
Lorant, Michael 388-R
Lord, Harold W. 131-P
Lord, K. M. 327-K, 429-K
Lord, Norman W. 135-N
Lord, Samuel S. 195-R
Lorenz, Wolfgang 78-P
Loria, E. A. 290-E, 135-G, 325-G
Loriers, Jean 92-P
Lorig, C. H. 522-Q, 956-Q
Loring, Samuel J. 603-Q
Loro, A. 787-Q
Lortkipanidze, B. G. 329-R
Lorz, R. M. 191-F
Loskutov, F. M. 65-C, 66-C
Lotz, W. E. 119-M
Loudenslager, O. W. 226-K
Lough, S. Allan 158-S
Loughlin, John 53-B, 14-V
Louis, H. 520-K
Lounsbury, M. 251-P
Loupoff, André 37-J
Love, R. J. 1051-Q
Lovering, Earle W. 261-F
Lovett, P. A. 332-M
Lovewell, Paul J. 158-S
Low, J. R., Jr. . . 141-M, 521-Q, 956-Q
Lowenheim, Frederick A. . . 37-L, 281-L
Lownie, H. W., Jr. 144-E
Loyd, C. C. 411-R
Lozinskii, M. G. 316-M, 195-N, 273-N, 921-Q
Lubahn, J. D. 284-Q
Lubkin, James L. 545-Q
Lucas, Gerhard 88-Q, 33-R
Lucas, L. L. 168-E
Lucas, L. N. 14-N
Lucas, William R. 282-N
Luchkin, G. P. 147-R
Lucke, Kurt 429-M, 432-M, 533-Q, 1042-Q
Ludwig, Davidlee von 56-E
Lueg, Werner 246-S
Luft, G. 445-R
Luiten C. H. 163-J, 232-T
Lukacs, Jozsef 98-H
Luke, Yudell L. 545-Q
Luker, Leslie G. 294-T
Lukirskij, P. I. 335-P
Lula, R. A. 452-R
Lund, Richard J. 224-A
Lundell, G. E. 251-S
Lundin, C. E. 72-M, 223-M
Lundin, Evert 66-Q
Lundin, Stig 583-K
Lundquist, R. V. 86-B
Lunn, Borge 1005-Q
Lustadt, Wilhelm S. 185-G
Luster, D. R. 479-Q
Lustman, B. 169-Q
Lutjen, G. P. 66-A
Lutsch, A. 390-S
Luttrell, R. B. 100-K
Lutwak, H. K. 700-L
Lutz, Garson A. 85-C
Lutz, R. F. 32-J
Luxenberg, Harold 631-Q
Lyall, Richard G. 101-K, 283-K
Lyle, John P., Jr. 7-H
Lyness, Arthur A., Jr. 33-J
Lyons, J. V. 345-M, 83-Q
Lysaght, V. E. 1002-Q
Lysak, L. I. 415-M
Lytle, M. L. 193-R, 259-R

M

Maag, O. L. 199-R
Maassen, Gerd 42-H
Mable, L. 223-L
MacCarthy, C. P. 73-J
MacDeermid, B. G. 185-B
MacDonald, A. 143-N
MacDonald, A. J. 228-D
MacDonald, D. K. C. . . .55-N, 65-P, ... 114-P, 166-P, 494-P, 512-P

MacDonald, R. E. 334-S
MacDonald, V. R. 93-C
Machenschalk, R. 412-M
Macher, Frigyes 138-C
Machin, C. F. 297-S
Machlin, E. S. . . . 76-N, 132-Q, 1030-Q
Machlup, S. 124-J
Machu, Willi . . . . . .
. . . 140-L, 657-L, 691-L, 71-R, 88-R
MacIntosh, Robert M. 281-L
Mack, David J. 116-N
Mack, Norman A. 211-T
Mackay, A. L. 285-M
MacKay, I. N. 210-T
MacKenzie, D. R. 251-P
Macks, E. F. 1009-Q
MacLaren, D. D. 588-Q
MacNeill, J. C. 241-D
MacNew, Thomas . 491-E, 349-K, 344-T
MacPeek, E. G. 91-M
MacWhirter, C. R. 100-J
Maczuk, J. 455-P
Maddick, C. E. 351-E, 531-E
Maddin, R. 170-Q, 753-Q, 890-Q
Maddox, C. O., Jr. 306-R
Madeco, Frederico Hruska H. . . 429-Q
Madsen, I. E. 40-A
Maesen, F. van der 491-P
Maetz, Helmut 124-B, 95-D
Maganus, Paul G. 218-E
Magee, G. M. 483-Q
Magel, T. T. 6-C
Magnel, G. 357-T
Mahr, H. 476-E
Maierson, Alvin T. 83-A
Mailander, Richard 997-Q
Mainstone, R. J. 820-Q
Makarov, N. I. 494-K
Makeev, M. G. 494-K
Makeev, N. I. 275-K
Makiguchi, Toshisada 514-E
Makram, Helmy 99-L, 139-N
Maksimova, O. P. 81-N, 105-N
Malaker, S. F. 23-P
Malavard, L. 430-Q
Malcolm, V. T. 872-Q
Malcor, H. 208-A
Malenock, P. R. 653-Q
Malkin, A. I. 399-G
Malkovsky, Jaroslav 284-A
Mallett, M. W. 75-N, 963-Q
Mallina, R. F. 402-K
Malmberg, Philip R. 223-S
Malmberg, T. 174-B
Malmlow, Eric G. 137-D
Maloney, J. 8-K, 274-K
Maloof, S. R. 106-Q
Malvezzi, Leopoldo 164-J
Malzacher, H. 307-D
Manier, Ralph L. 94-J
Manley, H. 368-S, 383-S
Manley, W. D. 364-Q, 660-Q
Mann, H. 197-T, 286-T, 288-T
Mann, Karl Ernst 128-C, 571-E
Mannin, J. . . . 206-G, 13-K, 139-K, 149-S
Manning, G. K. 260-F, 161-J
Manning, J. P. 19-B
Mansell, Rick 439-L, 52-R
Mansfield, E. H. 361-Q, 1010-Q
Mansfield, W. P. 196-R
Manson, S. S. . . . . .
. . . . . 305-Q, 604-Q, 738-Q, 915-Q
Mantel, W. 663-K
Manterfield, D. 40-S
Mantle, E. C. 247-J, 263-J
Manzella, Giuseppe 771-Q
Manzinger, Hans 180-K
Maranville, L. Frank 5-C
Marburg, Edgar 73-D
Marchand, G. 22-N
Marcotta, A. J. 49-E
Marcus, Jules A. 45-P
Marechal, J. 297-N
Marek, C. T. 282-E
Margolin, Harold 78-M, 129-N
Marin, Joseph . .416-Q, 417-Q, 552-Q,
. . 740-Q, 742-Q, 836-Q, 880-Q, 894-Q
Marincek, B. 426-P
Mark, Melvin 578-K
Markowitz, J. 497-Q
Markus, Harold 232-J
Marquez, Luis 252-P
Marr, Friedrich 7-B
Marsh, John S. 75-D
Marsh, Richard E. 294-M
Marshall, D. F. 9-D
Marshall, Douglas W. 1-B
Marshall, G. 187-P
Marshall, J. R. 15-R
Marshall, P. R. 3-H
Marshall, Shadburn 31-A
Marshall, T. A. 220-P
Marshall, W. A. 67-L
Marshall, W. K. B. 706-K
Marstrander, Rolf 12-J
Martin, A. B. 3-N
Martin, D. C. 213-K, 269-K
Martin, D. H. 464-P
Martin, D. L. 225-P
Martin, Don S., Jr. 320-P
Martin, D. W. 266-P
Martin, E. 287-T
Martin, G. 71-E, 252-E
Martin, G. N. 709-L

Martin, Harold C. 715-Q
Martin, Jack T. 266-R
Martin, James K. 46-T
Martin, J. J., Jr. 34-L
Martin, J. P. 129-J
Martin, L. L. 291-E
Martin, S. L. 151-C
Martin, W. A. 298-K
Martin, Wayne. 142-J
Martin, Z. Garcia 329-K, 633-K, 1023-Q
Martindale, R. G. 347-M
Martinez, B. P. 96-A
Martini, José 25-C
Martinson, M. N. 192-E
Martinson, M. W. 211-E, 234-E
Martius, U. M. 199-P
Marx, J. W. . 154-N, 162-P, 79-Q, 317-Q
Marx, L. 269-N
Mascre, Claude . . 249-M, 398-M, 417-M
Mash, Donald R. 566-Q
Masi, Oscar 392-S
Masing, Georg. 197-N, 290-P,
. . . . . 88-Q, 1042-Q, 56-R, 155-R
Maslanka-Ormanowa, Z. 175-C
Maslennikova, M. I. 86-N
Mason, A. O. 304-Q
Mason, F. H. 76-T
Mason, John F. 426-R
Mason, Mary A. . . 173-L, 537-L, 729-L
Mason, R. W., Jr. 338-T
Mason, W. P. . . . . .
. . . . . 402-K, 107-P, 197-P, 694-Q
Mass, F. 392-G
Massa, Anthony P. 222-L
Massey, T. F. 225-G
Massinon, Jean 320-S
Masumoto, Hakaru . 54-P, 55-P, 107-Q
Masur, E. F. 722-Q
Matas, Sebastian Feliu 134-M
Mathauser, Eldon E. 251-Q
Mathesius, Kurt 51-S
Mathewson, C. H. 367-T
Mathias, D. L. . . 102-K, 531-K, 652-K
Mathias, E. V. 184-R
Matsuura, Yuji 305-G
Matthaes, K. 212-R
Matthew, Clark 605-K
Matthews, J. B. 22-H
Matthews, J. C. 121-P
Matthews, T. F. N. 495-E, 609-E
Mattiesen, R. B. 993-Q
Matting, A. 130-K, 362-K
Mattson, V. L. 195-B
Matuyama, Eitaro 51-M
Mauer, J. 238-N
Maund, William J. 687-L
Maw, F. R. 296-D
Mawhinney, Matthew H. 238-A
Maxwell, E. 27-P
Maxwell, W. A. 21-Q
May, John E. 246-P
May, M. 503-Q
Mayer, G. 151-N
Mayer, J. H. 278-F
Mayer, Karl 464-Q
Mayer, K. E. 374-D
Mayer, Robert 49-S
Mayer-Kuckuk, T. 505-P
Mayers, J. 254-Q
Mayfield, Ross M. 190-J
Maykuth, D. J. 75-M, 76-M, 168-Q
Mayne, J. E. O. 100-R, 243-R
Mayne, K. I. 512-P
Mazia, Joseph 39-L
Mazurzak, W. 238-L
McAleer, Howard J. 35-L
McAllister, D. 28-T
McBride, C. C. 387-M
McBride, D. L. 155-D
McCabe, C. Law 261-P, 262-P
McCahn, Ralph H. 38-L
McCaig, M. 102-N
McCain, George L. 338-S
McCarthy, J. F. 116-J
McCarthy, J. J. 211-K
McCarthy, John A. 363-P
McClimont, W. 118-R
McClintock, Frank A. 747-Q
McClure, G. M. 512-Q
McConachie, James 157-E, 205-E
McConnell, L. D. 536-Q
McCormick, Frank J. 707-Q
McCormick, George C. 135-J
McCormick, T. F. . . . 20-F, 44-F, 234-F
McCormick, W. H. 102-Q
McCullough, J. D. 138-B
McCullough, W. E. 91-K
McCurdy, Hugh R. 67-C
McDaniel, William T. 55-B
McDermott, Paul G. 34-L
McDermott, William . . . 464-L, 664-L
McDole, C. J. 46-P
McDonough, J. O. 127-G
McDowell, C. E. 707-L
McDowell, J. Spotts 56-B
McElgin, James 106-J
McElhaney, Harry W. 124-A
McElroy, D. L. 60-N
McFaddin, D. E. 22-R
McFarlane, Norris B. 10-B
McGar, Benjamin H. 2-F, 173-S
McGarvey, F. X. 51-A
McGeary, R. K. 169-Q, 240-S
McGeer, J. P. 1-C

McGinley, E. E. 138-A
McGrandle, John 107-E
McGrew, Brownell, ... 143-B
McGuigan, M. James, Jr. 480-Q
McGuire, J. C. 4-M
McHargue, Carl J. . 204-N, 98-Q, 896-Q
McIntire, H. O. 260-F
McIntyre, A. M. 81-K
McIntyre, J. B. 115-C, 280-D,
. . . . . 3-E, 391-E, 554-E, 622-E
McIver, John K. 25-J
McKeehan, M. 162-Q
McKewan, William 419-R
McKinnon, Hugh C. 120-J, 258-S
McKinsey, C. R. 212-K
McLaren, T. A. 4-K
McLaughlin, J. Karl 385-G
McLaughlin, J. L. 166-L
McLaughlin, Merel W. . . . 109-J, 588-K
McLean, D. . . . . .
. . . .18-Q, 19-Q, 228-Q, 229-Q, 922-Q
McLeod, Alastair 81-F
McLoughlin, T. J. 5-D, 17-D
McMaster, Wardley D. 710-L
McMillan, William R. 331-M
McMullan, D. 97-M
McMullin, John G. 352-M, 388-M
McNair, G. D. 276-E
McNeill, H. L. 195-B
McPherson, A. E. 607-Q
McPherson, D. 46-L
McPherson, D. J. 44-M, 72-M,
. . . . . 73-M, 223-M, 224-M, 386-M
McQuillan, A. D. 346-M
McQuillan, Marion K. 36-S
McQuistan, R. B. 312-P
McRae, J. W. 402-K
McSharry, James J. 57-M
McSherry, P. B. 404-S
McWeeny, R. 297-M
McWilliam, J. A. 672-K
Meacham, Robert C. 743-Q
Meadows, J. W. 478-P
Mearns, William C. 102-J
Meboldt, W. 290-T
Mechlin, G. F. 13-N
Mecke, R. 61-H
Medsker, C. A. 340-K
Meechan, C. J. 226-P
Meek, Fred J. 86-A
Meek, Herman E. 171-D
Meerman, P. G. 41-B
Megaw, Helen D. 155-M
Megill, Lawrence R. 301-S
Meharry, C. H. . . . . .
. . . 35-B, 36-B, 37-B, 38-B, 39-B,
. . . . 40-B, 64-B, 112-B, 166-B, 88-C
Mehes, Kalman 138-C
Mehl, Robert F. . . . . .
. . . . . 369-M, 158-N, 832-Q, 1027-Q
Mehl, R. R. 258-N
Meier, J. H. 581-Q
Meier, J. W. 473-Q
Meierdirks, J. B., Jr. 277-S
Meijering, J. L. . . . . .
. . . .78-J, 209-J, 393-M, 420-M, 93-P
Meijs, J. C. 92-N
Meiklejohn, W. H. 204-P
Meinel, M. P. 10-G
Meinel, William J. 251-F
Meinke, W. Wayne 264-P
Melaney, Ralph L. 44-D
Melbye, Charles E. 251-A
Melcher, N. B. 66-A
Melchior, P. 812-Q, 879-Q, 249-R
Melcon, M. A. 496-Q, 985-Q
Melhardt, H. . . . 178-K, 245-K, 529-Q
Meller, Floyd H. 618-L
Mellor, G. A. 133-Q
Melnik, V. I. 99-H
Mendelssohn, K. 413-P, 419-P
Mennett, R. L. 221-B
Menter, J. W. 6-M
Menzel, E. 414-M
Menzel, Thomas J. 213-L
Menzel, W. 558-L
Menzel-Kopp, C. 414-M
Mercer, A. D. 179-R
Mercer, Robert S. 202-R
Merchant, M. E. 165-G
Mercier, Andre 330-D
Meredith, H. . . . 215-K, 221-K, 549-K
Merikanto, Bengt 112-S
Merims, R. 44-T
Mering, Jacques 227-M
Merlini, A. 1035-Q
Merlino, Francesco 439-Q
Merrill, C. W. 66-A
Merriman, A. D. 106-A, 249-A
Merrison, A. W. 30-M
Merritt, Charles, Jr. 169-L
Merritt, W. F. 156-P
Mesick, Benjamin S. 28-V
Mesnard, G. 292-P
Metcalfe, A. G. . . . 82-M, 421-M, 21-N
Metcalfe, G. J. 64-R, 120-R
Methers, F. C. 37-L
Metzger, M. 156-N
Metzger, William H., Jr. 608-L
Metzgers, F. R. 362-P
Meunier, Francis 77-D, 78-D
Meunier, L. 111-R
Meuret, J. 385-K
Mewes, Ernst 810-Q

Meyer, A. J., Jr. 604-Q
Meyer, A. Jean-Pierre 117-P
Meyer, Carl-Ludwig 291-P
Meyer, F., Jr. 284-S
Meyer, Gene 195-B
Meyer, Hans Otto 596-Q
Meyer, H. C., Jr. 16-V
Meyer, H. M. 596-K
Meyer, Karl-Heinz 84-C
Meyer, Peter 427-P
Meyer, W. 334-L
Meyer, Walter R. . 402-L, 549-L, 625-L
Meyerhoff, L. 387-Q
Meyers, B. 66-A
Meyersberg, G. 86-Q
Meyerson, Melvin R. 289-N
Meysenbug, C. M. von 1015-Q
Mezger, P. 426-M
Mezhlumian, R. A. 380-Q
Michael, A. B. 174-M
Michael, A. D. 35-V
Michael, D. G. 702-L
Michal, E. J. 216-B
Michalski, A. 133-S
Michaux, R. 286-D
Michel, André 74-N, 227-N, 178-Q
Michel, Pierre 322-M, 296-N
Michell, D. 138-Q
Michell, F. B. 119-B
Michels, A. 442-P
Michie, G. M. 7-E, 213-E, 265-E
Micleu, T. 186-Q
Middleton, B. F. 346-Q
Middleton, J. M. 416-E
Midgley, H. G. 232-D
Mielentz, W. 254-J
Mielenz, K. D. 225-S
Mielke, M. V. 221-B
Mieves, Ferd. 368-K
Mignolet, J. C. P. 408-P
Mihelich, J. W. 388-P
Mikheev, V. S. 275-M
Miklowitz, Julius 427-Q
Mikumo, Einosuke 197-Q
Miles, Allan T. . 34-B, 36-B, 38-B, 40-B
Millar, D. A. J. 312-Q, 974-Q
Miller, Charles 257-P
Miller, D. F. 544-Q
Miller, Edward C. 176-T
Miller, G. E. 459-L
Miller, G. L. 17-C, 62-V, 114-V
Miller, H. H. 101-G, 153-S
Miller, James A. 4-Q, 278-Q, 279-Q, 580-Q, 731-Q
Miller, L. G. 150-J
Miller, Mike A. . . 165-K, 575-K, 601-K
Miller, Norman C. 30-S, 364-S
Miller, Paul 79-F
Miller, Philip 354-S
Miller, R. F. 242-R
Miller, R. W. 226-D
Miller, W. Curtis 24-G
Miller, W. E. 204-S
Miller, W. H. 123-J
Millis, K. D. 67-J
Mills, Doremus L. 15-K
Mills, G. M. 193-K
Mills, J. R. 44-C
Mills, T. 591-L
Millward, H. J. 525-E
Milne, David 34-L, 400-L
Milne, W. . . 47-G, 115-G, 205-G, 259-G
Milner, C. J. 123-M
Miltner, Donald E. 309-R
Milward, C. F. 68-J
Minc, St. 447-R
Mindler, A. B. 248-A
Mindlin, R. D. . . . 547-Q, 693-Q, 694-Q
Miner, D. C. 180-L
Minsk, L. David 198-B
Minssieux, J. 88-E
Mintern, R. A. 5-M
Mintrop, R. 274-F
Mirantz, Matthew S. 220-K
Mishchenko, V. P. 450-P
Mishima, Tokushichi 18-N
Mishima, Yoshitsugu 19-N
Miskinova, T. A. 350-R
Mitchell, D. W. 177-B
Mitchell, James 217-D
Mitchell, John J. 407-P
Mitchell, K. A. 19-H
Mitchell, K. W. 664-Q, 822-Q
Mitchell, T. E. 233-D
Mitsche, R. 767-Q
Mitsuhasi, T. 64-Q
Mochel, N. L. 870-Q, 154-T
Mochrie, W. G. 100-C
Modjeska, R. Scott 626-L
Moelk, A. O. 134-J
Moen, Walter 673-K
Moguchii, L. N. 217-F, 785-Q
Mohler, J. B. 614-L, 295-T
Mohnkern, G. E. 105-J
Mohr, E. 944-Q
Mohr, G. 802-Q
Mohr, Th. 504-P
Moinet, M. 67-D
Momma, Sennosuke 670-Q
Monch, G. C. 503-P
Moneyron, M. 659-K
Moni, George E. 413-G
Monneret, Florent 122-E
Montagnon, E. 342-Q

Montalbetti, R. 175-P
Montalenti, G. 274-M
Montbrun, F. 183-Q
Moore, A. J. W. 55-Q
Moore, D. C. 538-K
Moore, Dwight G. . . . . .
. . 173-L, 436-L, 537-L, 729-L, 357-R
Moore, E. W. 231-R
Moore, H. F. 713-L, 830-Q
Moore, James H. . . 59-C, 160-C, 174-C
Moore, Lester W. 171-D
Moore, Mark B. 830-Q
Moore, R. W. 207-F
Moore, Stanley C. 166-R, 469-R
Moore, Walter J. 286-R, 288-R
Moore, W. H. 322-G
Moraes, Jose Ermirio de 257-A
Moraes, Luciano Jacques de . . . 161-B
Morales, Narciso 329-D
Moreau, Jean 173-R
Morehead, Frederick F., Jr. . . . 295-S
Morel, P. H. 202-L
Moressee, Ch. 122-K
Morey, R. E. 125-E
Morgan, Eric R. . . .216-M, 91-N, 311-P
Morgan, H. E. 336-Q
Morgan, J. B. 315-S
Morgan, T. D. 139-B
Morin, Louis H. 153-E
Morioka, Susumu 301-R
Morisset, Paul 55-L
Moritz, George R. 122-T
Morlet, E. 79-E
Morley, J. I. 910-Q
Morooka, Toshimasa 840-Q
Morozov, A. N. 117-D
Morral, F. R. 218-J, 246-Q
Morris, S. G. 717-L
Morrison, Donald M. 122-D
Morrison, F. T. 96-F
Morrison, George H. 65-S
Morrison, J. G. 144-J
Morrison, W. S. 38-L, 399-L
Morrogh, H. 233-Q
Morse, David 5-G
Mort, John H. 64-F, 67-F
Morton, George 236-K
Moser, Heribert. 466-Q
Moses, D. P. 708-L
Mosher, Fred D. 218-K
Mosher, L. M. 191-R
Moskowitz, David 64-H
Moss, James P. 411-K
Moss, N. 221-P
Moss, T. S. 492-P
Motalik, Franz 60-G
Mott, B. W. 220-M, 359-M, 391-M, 397-M
Mott, N. F. 100-M, 101-M,
. . . . 24-Q, 36-Q, 320-Q, 821-Q, 83-V
Mowbray, A. Q., Jr. 608-Q
Mudge, W. L., Jr. 523-Q
Mueller, Joan A. 330-G
Mueller, R. A. 208-K
Mueller-Magyari, F. 382-Q
Muhlinghaus, A. 392-K
Muhr, Karl-Heinrich 175-J
Mulcahy, B. P. 90-B, 38-E
Mulcahy, E. W. 261-L
Mulhearn, T. O. 492-Q
Mulker, Fred R. 245-R
Muller, A. 150-T
Muller, E. 159-T
Muller, E. A. W. . 425-P, 399-S, 408-S
Muller, Erwin W. 268-M, 294-P
Muller, H. E. 147-F
Muller, J. 37-H
Muller, R. 326-T
Muller-Busse, A. 434-Q, 472-R
Mund, A. 297-D
Munger, H. P. 74-A
Munning, A. P. 34-L
Munro, W. 562-Q
Munse, W. H. 13-Q, 139-Q
Muraca, Ralph F. 402-L, 625-L
Murakami, Yotaro 188-N
Muraki, Tsunemitsu 512-E
Murata, Iwao 35-D
Murdoch, A. W. 344-L
Murdoch, J. 451-E
Murphy, Alfred J. 42-A
Murphy, P. C. 58-M
Murphy, William J. 122-J
Murray, G. E. 589-L
Murray, J. D. 627-Q
Murray, William 356-K, 45-Q
Mutaguchi, Mototaka 515-E
Myers, David 377-R
Myers, D. M. 147-S
Myers, H. P. 376-P
Myers, R. C. 102-A
Myhill, A. R. 272-T
Myncke, H. 1037-Q
Myskowski, E. T. 285-E, 126-S

N

Nachbar, W. 736-Q
Nachtrieb, Norman H. 120-P, 9-R
Nadai, A. 726-Q
Nadel, Milton 39-L
Naeser, G. 262-D, 89-H
Naffrechoux, C. 388-K

Nagel, K. 125-K
Nagley, F. R. 13-L
Nagy, Tibor 315-A
Nakagawa, R. 64-Q
Nakai, Hiroshi 389-R
Nakayama, Tadayuki . . . 200-M, 330-M
Nankivell, J. F. 194-M
Nann, H. 322-L
Narayanan, P. L. A. 105-B, 140-B
Narcus, Harold 38-L, 215-L
Nardo, S. V. 719-Q
Nash, Julian W. 89-C
Nash, Roy 52-G
Nash, R. R. 91-M
Nathan, C. C. 260-R
Nathorst, Helmer 24-V
Naumann, R. A. 370-P
Naumann, Virgil O. 52-N
Naylor, C. E. 38-L, 49-L
Needham, J. C. . . . 67-K, 175-K, 699-K
Neemes, J. C. 160-Q
Neerfeld, Helmut 47-N
Negenvitskii, I. B. 450-P
Nehrenberg, A. E. 283-N
Neifert, H. R. 832-Q
Nell, E. 452-L
Nelson, B. J. 101-R
Nelson, D. B. 186-T
Nelson, E. C. 657-K
Nelson, Edward B. 237-P
Nelson, E. J. 288-K
Nelson, H. R. 75-N
Nelson, J. F. 269-F
Nelson, M. R. 204-G
Nelson, R. G. 52-F
Nelson, W. L. 319-R, 359-R
Nepper, M. 36-D
Neppiras, E. A. 363-S
Nesbitt, E. A. 208-P
Nesbitt, J. D. 10-F
Nesbitt, L. B. 888-Q
Nester, W. H. . . . 255-M, 266-P, 321-P
Nesterenko, E. G. 415-M
Netz, Heinrich 153-R
Neudoerffer, Albert L. 143-J
Neuenkirchen, H. v. 126-K, 395-K
Neuhaus, Alfred 90-J
Neuhaus, Herbert 115-B, 661-K
Neuhaus, Werner 274-J
Neumann, Th. 304-P
New, J. C. 446-Q
Newcomb, C. E. 28-C
Newell, I. Laird 73-R
Newell, Thomas M. 85-R, 102-R
Newhall, D. H. 125-T
Newhall, H. S. 199-D, 317-D
Newhouse, V. L. 462-P
Newitt, D. M. 155-S
Newkirk, J. B. . . . 300-M, 157-N, 167-N
Newman, D. P. 765-Q, 874-Q
Newmark, N. M. . 696-Q, 711-Q, 993-Q
Newton, E. H. 65-L
Newton, R. E. 744-Q
Nicholas, J. F. 83-N
Nicol, A. D. I. 257-M
Nicolas, Pierre . . 255-E, 346-E, 430-E
Nichols, R. L. 33-S
Nickel, Otto 197-N
Nickelsen, Obering D. 12-T
Niebch, Georg 139-J
Niedermeyer, O. 208-L
Niedt, George E. 202-R
Niedzwiedzki, Antoni 411-G
Nielsch, Walter 487-Q
Nielsen, John P. 78-M, 79-M
Nielsen, Otto 36-C
Nijhawan, B. R. 149-B, 48-M
Nikonorova, A. L. 105-N
Nimburt, A. K. 283-G
Nippes, E. F. . . . 211-K, 577-K, 657-K
Nisbet, J. D. 892-Q
Nishikiori, Seiji 9-V
Nishimura, Hideo 188-N
Niwa, Noboru 97-S
Nixon, E. W. 296-D
Nixon, W. B. 11-T
Nixon, W. C. 199-M
Nock, J. A., Jr. 270-Q, 420-R, 428-R, 463-R
Nodtvedt, Henrik 28-P
Nolan, V. J. 132-D
Nolen, W. A. J. 191-K
Nord, Melvin 65-A
Nordenson, W. H. 341-T
Norén, Tore 270-J, 79-K, 140-K, 572-K, 121-N, 360-Q
Noris, Mario 116-E
Norman, Alfred W. 68-L
Norton, Francis J. 123-N
Norton, J. T. 2-H, 352-M, 255-N, 406-Q
Nosova, Z. A. 584-L
Nova, David 597-K
Novotny, Franz 105-L
Novozhilov, V. V. 781-Q
Nowick, A. S. . . . 354-M, 10-Q, 316-Q
Nowotny, H. 144-M, 309-M, 310-M, 412-M, 413-M, 430-P
Nudel'man, Ia. L. 60-Q
Nunez, Antonio Villanueva 263-Q
Nunner, W. 400-S
Nuovo, M. 816-Q
Nurse, R. W. 232-D
Nurse, T. J. 62-R, 136-R, 337-R
Nury, Georges 253-J, 345-P

Nussbaum, A. I. 193-F
Nusslin, Horst 275-F
Nuttall, Henry 421-Q
Nye, J. F. 140-M, 326-Q
Nygren, Erik 304-R

O

Oaks, J. K. 388-Q
Oates, John J. 202-R
Oberg, Norman W. 121-T
Obermuller, A. 573-E
Oberst, Hermann 214-Q
Obregon, Salvador Cortes. 209-B
Obreski, John 198-J
Obrowski, Walter 170-N
Obrzut, J. J. 168-S
Obukhov, A. V. 495-K
O'Connor, D. T. 28-S, 115-S
Odekerken, H. J. 41-B
Odell, N. H. 3-P
Oding, I. A. 316-M, 273-N, 433-P, 817-Q
Odqvist, Folke K. 954-Q
Oehler, G. 217-G
Oelsen, Willy 124-B, 95-D, 111-D, 206-D, 276-S
Oey, T. S. 136-P
Ogale, G. K. 35-A
Ogan, A. C. 7-D
Ogawa, K. 457-Q
Ogawa, Shiro 11-N
Ogden, H. R. 89-C, 75-M, 76-M, 77-M, 168-Q
Ogden, Jack 361-K, 427-K, 639-K
Ogilvie, G. J. 540-Q
Ohara, Toru 54-P
Ohm, Donna M. 295-G
Okazaki, A. 183-P
O'Keefe, J. F. 36-L
O'Keefe, Phillip 89-K
Okorokov, N. V. 116-D
Okubo, H. 556-Q, 887-Q
Okubo, S. 48-S
Oldham, Graham 90-C
Oliver, D. J. 189-P, 483-P
Oliver, J. P. 4-R
Olliver, C. W. 276-M
Olsen, J. L. 64-P
Olson, Carl F. 562-E
Olson, E. E. 486-K
Olson, Elmer L. 275-P
Olson, H. H. 641-K
Olson, Ray 206-E, 305-E
Olton, Dirck 25-G, 125-G
Oman, G. L. 321-E
Omar, M. 299-P
Onat, E. T. 244-Q
O'Neil, J. R. 331-G
O'Neill, H. 706-K, 367-Q
Onitsch-Modl, E. M. . . 2-H, 92-H, 16-N
Operhall, Ted 35-E
Opinsky, A. J. 59-R
Opitz, H. 51-G, 347-G
Opitz, W. 270-N
Oppelt, W. H. 162-R
Optiz, R. 646-E
Oravec, J. J. 161-S
Orban, R. 84-E
Ore, R. 703-L
Orem, T. H. 692-L
Oriani, R. A. 113-N, 42-P, 165-P, 421-P
Ornitz, M. N. 224-Q
Orowan, E. 326-Q, 724-Q
Orr, Raymond L. 119-P
Orton, J. P. 160-S
Orton, L. H. 67-K, 175-K
Orton, R. E. 77-G
Osadchuk, Roman 418-M
Osborn, E. F. 146-B, 85-D
Osborn, G. H. 200-S
Osborne, A. H. 140-A
Osbrink, Ray 47-E
Osgood, William R. 718-Q
Oshiumi, Masaki 197-Q
Osipov, K. A. 19-J, 921-Q
Osmer, T. F. 402-K, 694-Q
Ott, G. H. 50-T
Otte, H. M. 52-J
Ottens, Edwin F. 225-L
Ouwerkerk, L. van 287-S
Over, Ray E. 229-D
Overhauser, Albert W. . . 178-M, 112-P
Owe Berg, T. G. 236-R, 443-R
Owen, E. A. 234-M
Owen, W. S. 229-J, 7-M
Owner, F. M. 932-Q
Oxenbury, R. W. 236-J
Oya, Shigeo 837-Q
Oyler, Glenn W. 656-K

P

Paasche, O. G. 126-M
Pachaly, Eberhard 253-D
Pack, C. 496-E
Padmanabhan, V. M. 104-M
Paganelli, M. 377-M
Paglialunga, L. 815-Q
Pahlitzsch, G. 95-G
Paige, Henry 21-R
Paisley, Samuel J. 3-S
Pal'chuk, N. Iu. 494-K
Palfi, G. 163-B
Palme, R. 346-R

Palmer, Charles 216-J
Palmer, K. B. 378-P, 979-Q
Palmer, S. W. 234-J
Palmer, T. J. 83-K
Palsulich, J. 14-T
Panina, I. K. 450-P
Pao, Yoh-Han . . . 416-Q, 552-Q, 740-Q
Papen, George W. 43-T
Papier, Jean 74-N
Papp, C. A. 75-N
Papp, Elemer 136-C
Paranjape, B. V. 576-Q
Parcel, R. W. 7-V
Pardue, T. E. 589-Q
Pardus, Andrew J. 53-S
Paret, Richard E. 30-G, 25-K
Pargeter, J. H. 189-F
Parham, D. N. 307-R
Parina, John, Jr. 576-L, 253-R
Paris, B. L. 695-L
Parker, Ben H. 251-A
Parker, Edward A. 37-L
Parker, E. R. . . . . .110-N, 256-N, 172-Q, 445-Q, . . 632-Q, 637-Q, 898-Q, 899-Q, 971-Q
Parker, Frank C. 45-S, 74-S
Parker, H. A. 271-D
Parker, Marshall E. . . 87-R, 103-R, . . 200-R, 201-R, 203-R, 318-R, 423-R
Parker, W. G. 293-E
Parker, W. N. 88-F
Parkes, A. R. . . . 221-E, 275-E, 314-E
Parkes, E. W. 215-Q
Parkes, W. B. 52-E, 247-E, 557-E
Parkins, R. N. 462-E, 610-E, 881-Q, 127-R
Parkinson, E. N. 558-L
Parkinson, N. 168-L, 282-L
Parks, John M. 342-K
Parlanti, C. A. 222-E
Parr, J. Gordon 18-M, 221-M, 106-N, 126-T
Parris, W. M. . . . 227-J, 385-M, 57-N
Parry-Jones, R. 316-P
Parsegian, V. L. 158-S
Parsons, H. W. 345-Q
Parsons, K. A. 369-Q
Parsons, Marshall C. 251-A
Parsons, Richard W. 259-J
Parthasarathi, M. N. 48-M
Partington, J. R. 61-P
Parzen, G. 67-P
Pascal, J. 52-C, 368-E, 469-E, 472-E, 600-E
Pascaud, Claude 13-H
Paschal, M. 164-F
Paschke, M. 646-E
Paschkis, V. 288-E, 26-J
Patel, J. R. 309-N
Pateman, L. W. 125-N
Paterson, A. A. 228-L
Paterson, J. H. 413-K
Paterson, O. D. 182-B
Patriarca, P. 478-K
Patrick, R. F. 586-L
Patrick, W. A. 118-P
Patrie, Jos. 272-R, 362-R
Patton, Richard A. 32-R
Patton, W. G. . . . . . . 447-E, 25-F, 8-G, 104-G, 243-G, . . . 309-G, 261-J, 32-L, 601-L, 268-Q
Patzelt, Harold 47-R
Paukov, P. V. 194-E
Paulding, G. B. 77-C
Pauli, W. J. 692-L
Pauling, Linus 357-P
Paulson, C. F. 28-A, 49-A, 248-A, 616-L, 623-L
Pauly, Jules 184-S
Paustian, John H. 25-E
Pavlov, Z. P. 1022-Q
Pawlek, Franz 115-B, 62-P
Pawlow, M. A. 360-D, 361-D
Pawlowski, J. 525-Q
Paxton, H. W. 139-M, 163-Q, 1029-Q
Payne, R. J. M. 35-V
Payson, Peter 374-Q
Peabody, A. W. 61-R, 465-R
Peach, Milton O. 36-M
Peacock, J. A. 202-F
Peacock, Paul E., Jr. 65-J
Pearce, J. G. 557-E
Pearce, J. H. 150-E
Pearlman, N. 18-P
Pearsall, C. S. 287-K
Pearson, Alfred E. 71-K
Pearson, B. M. 11-J
Pearson, E. C. 78-K
Pearson, G. L. 233-P
Pearson, J. 103-D
Pearson, Oscar 162-S
Pearson, Robert J. B. 257-E
Pearson, W. B. 25-M, 108-M, 166-P, 494-P
Peck, P. E. 118-F
Pederson, J. T. 421-L
Peebles, A. A. 489-Q
Peers, A. M. 188-R
Peierls, R. W. 166-M
Peifer, N. P. 324-L
Peirce, W. M. 51-C
Peiser, H. S. 125-N
Pekelharing, A. J. 355-G
Pell, E. M. 248-P

Pell, Roy 67-E
Pell, W. H. 735-Q
Pelletier, L. 658-K
Pellini, W. S. . . . . .125-E, 169-E, 285-E, 294-E, 298-E, ... 630-E, 56-Q, 58-Q, 470-Q, 82-S
Pell-Walpole, W. T. 528-E, 588-E, 613-E
Palzel, E. 1014-Q, 489-R
Pemberton, H. N. . 138-K, 182-K, 414-K
Penning, P. 491-P
Pentz, P. G. 40-E, 239-E
Pepinsky, Ray 212-M
Pepper, E. L. 90-D
Pepperhoff, Werner 60-P
Peretti, E. A. 98-M
Pereturina, E. F. 139-C
Perin, Gabriel 357-D
Perkas, M. D. 88-J, 209-N
Perkins, H. C. 447-Q
Perkins, Walter 314-R
Perlman, I. 331-P
Perrault, George, Jr. 208-F
Perrier, A. L. 49-P
Perrone, A. 445-R
Perrot, Marcel 446-P
Perruche, L. 156-A
Perry, A. L. H. 225-F, 10-J
Perry, H. W. 84-G, 351-G
Perry, T. E. 29-C
Perryman, E. C. W. 47-M, 236-M, 237-M
Perryman, Eric-Charles 111-Q
Persons, R. W. 102-Q
Persson, R. 212-P
Perucca, Eligio 310-S
Pesak, Frank J. 109-F
Pessl, H. J. 248-F, 314-G
Petch, N. J. 225-N, 478-Q
Petelina, S. B. 323-K
Peters, E. 232-B
Peters, L. 324-E
Peters, Roger W. 730-Q
Petersen, Cord 41-Q, 296-Q
Petersen, Otto-Max 110-D
Petersen, V. C. 470-L
Peterson, A. 216-G
Peterson, E. C. 95-F
Peterson, John 222-D
Peterson, R. E. 871-Q
Peterson, R. O. 189-L
Peterson, W. M. . 179-E, 244-E, 383-E
Petersson, S. 799-Q, 935-Q
Peth, J. C. 228-F
Petit, Daniel 190-D
Petitdidier, Max 285-D
Petri, R. 104-L
Petrman, Ivo 343-D
Petrocelli, J. V. 9-P
Petrov, A. V. 319-K
Petrzela, L. 565-E
Pettersson, Holger 486-E
Pettit, R. E. 192-L
Petzold, Franz 229-A
Pevzner, L. M. 107-N
Pfann, W. G. 179-M
Pfannenschmidt, C. W. . . 645-E, 646-E
Pfau, Hans 132-M
Pfeifer, F. 302-P
Pfeiffer, Harold 44-R, 216-R
Pfeiffer, Richard 256-F
Pfeil, L. B. 193-A, 281-Q
Pfisterer, Hermann 335-M
Phelps, H. C. . . . . 31-J, 36-K, ... 159-K, 240-K, 417-K, 616-K
Phelps, R. A. 35-K
Philbrook, W. O. 333-D
Philipon, H. 90-E
Philippi, W. 583-L
Phillips, Aris 419-Q
Phillips, Arthur L. . . 66-E, 96-K, 29-N
Phillips, E. 582-Q, 704-Q
Phillips, Garnet P. 4-E
Phillips, H. W. L. . . . 343-M, 1051-Q
Phillips, K. 300-P
Phillips, V. A. . . . 29-N, 667-Q, 668-Q
Phipps, G. A. 203-F
Pian, T. H. H. 687-Q
Piana, Luciano 355-D
Piatti, Luigi 78-T
Pickering, F. B. 39-M
Pickett, G. 555-Q, 707-Q
Pidgeon, L. M. 94-C, 209-M
Pierce, E. W. 157-D
Pierce, J. A. 189-D
Pierce, J. J. 303-S
Pierce, W. B. 369-D
Piercy, G. R. 311-P
Pigott, E. C. 157-S
Pigott, R. J. S. 28-G
Pillon, Andre 313-L
Pincherle, L. 492-P
Pincus, A. G. 294-K
Pindrus, Pierre 118-S
Pines, B. Ia. 318-M
Pingel, J. H. 222-S
Pinke, Kurt G. O. 355-L
Pinkel, R. H. 204-J
Pinner, R. 475-L, 593-L, 696-L
Pinner, W. L. . . 1-A, 54-A, 56-A, 627-L
Pinta, Maurice 197-S
Pinter, Andras 525-K
Piontelli, R. 153-L, 106-R, 167-R
Piper, Erich 277-D
Pippard, A. B. 122-P, 1051-Q
Pippard, A. J. S. 264-Q

Pirani, M. 82-C
Pirard, S. H. M. 517-K
Piret, Edgar L. 49-B
Pirie, J. M. 303-T
Pironneau, Yves 354-Q
Pitkin, W. R. 21-H
Pitts, J. W. 357-R
Piwowarsky, E. 176-E, 190-E,
. . . . . 409-E, 412-E, 604-E, 284-F
Place, G. W. 319-G
Place, J. A. . 658-Q, 39-S, 142-S, 143-S
Plaksin, E. N. 80-B
Plateau, J. 32-N
Platz, K. 220-T
Pleines, E. W. . . . 523-K, 625-K, 701-K
Plenard, Elisabeth 939-Q
Plennert, Joseph 428-L
Pleteneva, N. A. 69-G
Plummer, F. L. 421-K
Pniewski, E. J. 243-P
Poast, John 98-B
Pocock, Bryant W. 103-S
Poetto, Peter G. 98-K
Poggie, Joseph 480-P
Pohlman, R. 403-S
Polakowski, N. H. . . . 246-D, 130-F,
. . . .273-F, 63-Q, 81-Q, 494-Q, 666-Q
Polanco, Guillermo S. 156-K
Poliak, M. S. 689-K
Poliakov, A. 432-P, 1048-Q
Poll, J. A. 101-B
Pollack, A. 317-L, 321-L, 388-L, 738-L
Pollard, H. J. 123-T, 178-T
Pollard, Rolla E. 111-H
Pollock 229-F, 333-G
Pollock, Curtis 239-D
Polmear, I. J. 157-M
Polydoroff, W. J. 12-H
Pomaska, W. 650-L, 1018-Q
Pomey, Jacques 266-N
Pomp, A. . . 145-F, 89-J, 139-J, 175-J
Pond, Warren A. 155-B
Ponemon, Richard D. 82-H
Ponomarev, S. D. 292-S
Pool, M. L. 234-P, 365-P
Poole, G. 60-F
Poole, L. K. 580-K
Poole, S. W. 91-D
Poor, John G. 37-L
Popilov, L. Ya. 152-J, 257-J
Popoff, A. 85-Q
Popoff, Constantine C. 74-B
Popov, A. A. 114-N
Popov, E. P. 739-Q
Poppe, Kurt E. 351-D
Pörod, Gunther 120-N
Porst, E. G. 586-L
Portch, G. G. 95-R
Porter, A. S. 342-P, 343-P
Porter, F. C. 456-R, 480-R
Porter, F. R. 30-L, 122-L, 357-L
Porter, Fred T. 265-P
Porter, Lew F. . . . 139-E, 143-E, 441-E
Porter, William N. 12-C
Portevin, Albert M. . . . . .
. . . 117-E, 570-E, 193-J, 522-K, 27-R
Portis, A. M. 368-P
Portnoy, W. M. 247-P
Post, Benjamin 64-H
Post, C. B. 225-D
Post, C. P. 118-B
Postman, B. F. 34-L
Pottecher, Luis 48-D, 447-K
Potter, C. L. 99-B
Potter, William T. 268-K, 465-K
Pouilly, M. L. 244-L
Poulignier, J. . . . 128-M, 334-M, 17-S
Pourbaix, Marcel 78-A, 107-R,
. . . . . 108-R, 112-R, 271-R, 370-R
Pow, J. 1000-Q
Powell, Alfred R. 203-B, 149-C
Powell, E. B. 305-R
Powell, G. W. 228-J
Powell, H. M. 287-R
Powell, R. G. 216-B
Powell, R. W. 340-P, 412-P
Power, Henry R. 133-L
Powers, A. E. 966-Q
Powers, Edmond C. 375-K
Powers, J. H. 409-M
Powers, Marion D. 138-P
Powers, R. A. 254-S
Poy, George Lim 353-L
Poynter, James W. 303-Q, 850-Q
Pradhan, V. S. 177-B
Prager, W. 733-Q, 735-Q, 800-Q
Prakash, Brahm 38-C
Prange, F. A. 49-R
Pranses, A. L. 42-J
Prati, A. 378-S
Pratt, P. L. 288-Q, 318-Q
Pratt, W. E. 478-R
Pratt, Wilson N. . . 230-E, 50-H, 74-H
Prchal, Lawrence A. 31-G
Preble, I. L. 265-J
Preece, A. 366-Q, 33-R, 63-R
Prescott, Francis J. 676-L
Preston, R. St. J. 418-R, 461-R
Price, E. F. 81-S
Price, J. D. 100-B, 204-B, 215-B
Pridantsev, M. 249-T
Prieto, Joaquin 341-D
Prieur, Gottfried 110-D
Primakoff, H. 318-P

Prince, M. B. 414-P
Prine, Walter H. 37-L, 40-L
Pring, R. T. 59-E
Pritchard, Edwin 257-L
Privoznik, L. J. 57-Q
Promisel, Nathan E. . 37-L, 42-L, 77-V
Proskin, G. A. 689-K
Prosvirin, V. I. 246-D, 784-Q
Provan, A. G. 663-Q
Provias, P. 10-E
Prudhomme, H. P. 430-K
Pruet, C. J. 161-A
Pruett, S. Clifton 243-J
Pruger, T. A. 88-T
Pry, R. H. 165-N
Pryakhina, L. I. 909-Q
Pryce, M. H. L. 111-M, 167-M
Pryor, M. J. 11-R, 194-R
Pugachevich, P. P. 434-P
Pugh, Arthur 111-A
Pugh, Emerson M. . . 68-P, 200-P, 383-P
Pugh, H. L. D. 798-Q
Pugh, J. W. 61-C
Pugh, S. F. 318-Q
Pullan, G. T. 253-P
Pullen, F. R. 139-F
Pumphrey, W. I. 36-G, 79-G, 258-K, 314-K, 416-K, 603-K, 345-M, 83-Q, 200-Q, 826-Q
Püngel, W. 527-Q
Purchas, J. G. 698-K
Purchase, N. W. 797-Q
Purdy, R. B. 14-T
Pursey, H. 370-Q
Pusch, Richard 137-F
Putilova, I. N. 349-R, 369-R
Putman, A. W. 131-L
Puzak, Peter P. 56-Q

Q

Quaely, Martin F. 620-L, 728-L
Quarendon, R. 540-L, 332-S
Queneau, B. R. 7-D
Queyrel, Paul J. 20-G
Quigley, James 163-K
Quigna, R. 228-K, 386-K

R

Raabe, W. 364-K
Rabinowicz, E. 40-M, 225-Q
Rabotnov, Y. N. 788-Q
Rabovskii, M. G. 178-J
Radcliffe, J. C. 142-E
Radcliffe, R. S. 106-C
Rädeker, Wilhelm 274-R, 303-R
Radford, J. F. 423-K
Radhakrishna, P. 167-S
Raffo, E. F. 19-B
Rahbek, H. 31-N
Rahrer, G. D. 213-G
Raick, Julien O. 29-D
Raimes, S. 1026-Q
Raine, T. 236-N
Rainey, D. L. 196-B
Rains, E. M. . . . 104-K, 309-L, 684-L
Raistrick, Arthur 202-E
Rait, J. R. 195-Q, 1006-Q
Ralston, H. J. 594-K
Ralston, Oliver C. 133-B
Ram, D. Jagat 223-D
Ramachandran, G. N. 260-M
Rama Char, T. L. 277-L
Ramamurthy, S. 35-C
Ramaseshan, S. 260-M
Ramberg, Walter 278-Q, 279-Q, 652-Q, 731-Q
Rame, Paul 122-E
Ramonacho, M. de Miro. 201-K, 446-K, 507-K
Ramsey, J. A. 38-M, 33-N
Ramsey, R. H. 25-B
Ramseyer, Charles F. . . 98-A, 289-A
Ramshage, Bengt 360-Q
Ranc, Gaston 26-L
Randall, K. C. 1051-Q
Randich, E. A. 262-J
Randle, K. C. 56-J
Rank, D. H. 245-P
Ransom, J. T. 832-Q, 962-Q
Rao, C. V. Joga 661-Q, 662-Q
Rao, E. C. L. 284-L
Rapatz, Franz 60-G, 395-G
Rasch, J. 228-M, 374-M
Rase, Howard F. 194-S
Rasi, Antonio 423-P
Rasmussen, R. T. C. 45-C, 10-D
Rassbach, H. P. 273-D
Rath, R. 284-R
Ratnam, C. V. S. 261-D
Raub, E. 450-L, 558-L, 248-M, 373-M, 488-P
Rauch, E. 213-A
Raudebaugh, Robert J. 62-A
Rauh, C. 572-E
Rauzen, Ya. R. 86-N
Rave, W. J. 112-C
Ravery, M. 47-J
Ravitz, S. F. 44-B, 71-B
Raymond, Walter A. 36-L, 37-L
Raynor, G. V. 149-M, 253-M, 293-M, 512-P
Raynor, W. M. 104-C, 17-V

Read, T. A. 97-Q
Read, W. T. 499-Q
Reardon, Arthur S. 54-J
Redding, James F. 279-T
Redfern, D. 271-E
Redmond, John C. 263-G
Redmond, John H. 145-K
Reed, Avery H., Jr. 202-B
Reed, J. A. 235-F
Reed, Lewis B. 50-E
Reents, A. C. 55-A
Rees, W. P. 61-Q, 82-Q, 513-Q
Reeve, L. 706-K, 611-Q
Reeve, M. R. 83-M
Reeves, M. 20-L
Reggiori, Alessandro 37-D
Regis, M. 70-F
Rehder, J. E. 268-D, 208-Q
Reichardt, Herman 207-G
Reichel, Fritz 103-L
Reichenecker, W. J. 629-Q
Reid, Everett C. 286-E
Reid, G. W. 224-E
Reid, Vaughan C. 181-E, 218-E
Reidemeister, F. 267-A
Reiffel, L. 179-S
Reignier, M. 79-R
Reimann, Martin 393-L
Reindl, Rudolf 305-A
Reinhardt, Robert T. 47-F, 357-G
Reininger, H. 154-L, 315-L, 396-L, 398-L, 457-L
Reinken, L. W. 175-L
Reinmann, R. 104-P
Reinsmith, Gerald 586-K
Reissner, Eric 254-Q
Reiter, Fred M. 75-L
Reiter, S. F. 388-M
Reitz, R. 319-P
Rekar, Ciril 353-D
Renard, A. 458-Q
Renne, I. P. 419-G
Reno, W. P. 131-J
Renton, C. A. 413-P
Resen, F. Lawrence 378-L
Rest, Pierre van der 15-A
Revuelta, A. 450-K
Rey, M. 96-B, 224-B
Reynolds, C. C. 472-Q
Reynolds, C. F. 211-Q
Reynolds, John H. 271-S
Reynolds, R. S., Jr. 234-A
Reynolds, Thomas 104-F, 491-Q
Rhoades-Brown, J. E. 338-R
Rhodin, T. N. 108-P
Riccardo, A. E. 119-E
Rice, Gordon 113-S
Richard, K. 87-Q, 156-Q, 1019-Q, 1040-Q
Richards, A. D. 843-Q
Richards, Edmund T. 254-T
Richards, G. W. 105-F, 131-F
Richards, H. K. 241-P
Richards, J. E. 54-Q
Richards, John T. 650-Q, 402-R
Richards, R. L. 337-D
Richardson, A. C. 89-B, 121-B
Richardson, F. D. . . 96-B, 145-C, 127-P
Richmond, J. C. 436-L, 357-R
Richmond, W. W. 560-E
Richter, F. 81-E
Richter, Frederick H. 484-R
Richter, H. 371-M
Richter, Hartmut W. 287-L
Rickett, R. L. . . . 214-N, 287-N, 304-Q
Riddihough, M. 481-L
Rideout, Gordon T. 164-G
Ridge, J. D. 81-A
Ridley, R. W. 133-Q
Riedel, J. Y. 64-J, 248-J
Riemann, W. 167-F
Riemenschneider, R. W. 717-L
Rigbey, J. V. 31-S
Rigg, J. G. 430-L, 679-L
Rightmire, B. G. 567-Q
Riley, R. V. 31-B, 14-K
Rinebolt, John A. 965-Q
Rinehart, John S. 39-Q
Rinker, E. C. 431-L, 547-L
Riott, J. P. 120-A
Ripling, E. J. . . . 286-N, 69-Q, 100-Q
Ripperger, E. A. 594-Q
Rippetoe, J. A., Jr. 294-R, 378-R
Ripple, John W. 86-G
Risler, Clark B. 93-B
Ristroph, J. D. 305-R
Ritchey, N. F. 236-T
Ritchie, J. G. 233-J
Ritchings, Frank A. 265-T, 296-T
Ritter, Egon 69-F
Ritter, Franz 487-R
Ritz, W. 691-Q
Ritzau, G. 2-H, 93-H
Rix, Walter 132-M
Roach, Arvid E. 923-Q
Roach, J. D. 230-D, 408-R
Roast, Harold J. 45-E, 278-E, 380-E, 332-T
Robeck, C. A. 283-E
Roberson, A. H. . . 116-C, 126-M, 225-M
Roberts, A. T. 440-K
Roberts, C. S. 59-N, 889-Q
Roberts, C. W. 50-C, 121-R
Roberts, E. A. O'Donnell 234-M
Roberts, F. F. 512-P

Roberts, George A. 285-N
Roberts, J. E. 172-K, 290-K, 291-K, 1028-Q
Roberts, R. R. 188-K
Roberts, T. M. 291-K
Robertson, J. M. 339-Q
Robertson, W. D. 159-P, 474-P
Robiette, A. G. E. 159-C
Robin, Jacques 92-M
Robin, Simone 285-P
Robinson, C. E. 134-G
Robinson, D. L. 175-M, 342-M
Robinson, Harold 572-K
Robinson, Ian R. 1051-Q
Robinson, R. M. 421-R
Rocha, H. J. 149-R
Rocquet, P. 312-L
Roe, Lawrence A. 68-B
Roebuck, A. H. 421-R
Roesch, K. 371-E
Rogener, H. 436-R
Rogers, B. A. 274-T
Rogers, Fred 155-F
Rogers, L. B. 169-L
Rogers, R. R. 100-N, 253-N
Rogers, T. H. 116-S
Rogers, W. F. 48-R
Rögnitz, Hans 160-A
Rohrbach, Christof 390-Q, 760-Q
Rohrig, I. A. 216-K, 653-K
Rohrmann, Adolph 18-F
Roig, Mario Pujol 97-N
Roiter, V. A. 213-B
Rolin, Maurice 107-C
Rolink, F. J. H. 42-G
Roll, F. . . . 80-E, 146-E, 225-E, 394-K
Roll, Kempton H. 60-R
Roll, M. Franz 467-E
Rollason, E. C. 612-Q
Rollin, B. V. 149-P
Romanoff, Melvin 24-R, 25-R
Rontgen, P. 134-C
Rooksby, H. P. . . . 168-L, 558-L, 31-M
Rooste, E. E. 101-H
Root, W. B. 208-K
Ros, M. 758-Q
Rosard, D. D. 551-Q
Rose, Arnold S. 105-G, 70-K
Rose, George S. 272-A
Rose, H. E. 34-H
Rose, J. E. 222-S
Rose, Kenneth 72-E, 129-G, 351-Q
Rose, R. T. 267-Q
Rosecrans, S. A. 81-T
Rosen, B. Walter 606-K
Rosen, C. G. A. 130-A
Rosen, J. 143-N
Rosenauer, Othmar 256-A
Rosenbaum, B. B. 6-D
Rosenbaum, Joe B. 157-B
Rosenbaum, Kurt 227-S
Rosenberg, A. J. 200-J
Rosenberg, H. M. 64-P, 419-P
Rosenberg, R. M. 688-Q
Rosenberg, S. J. . . 136-M, 168-N, 289-N
Rosenblatt, A. L. 278-P
Rosenblum, Charles 158-S
Rösener, W. 304-P
Rosenkranz, W. 946-Q
Rosenthal, D. 741-Q
Rosenthal, H. 284-E, 339-E
Rosenthal, Philip C. 139-E, 143-E, 441-E
Rosi, Fred D. 9-N, 167-Q
Rösler, U. 102-M
Ross, Donald 108-K
Ross, Erle, F. . . . 636-E, 479-L, 503-L
Ross, H. U. 15-B
Ross, S. D. 216-S
Ross, T. K. 183-R
Rossi-Landi, G. 386-L
Rosskopf, T. 571-K
Rostoker, Norman 4-P, 200-P
Rostoker, W. . . . . 382-E, 674-K, . . 173-M, 351-M, 389-M, 61-N, 960-Q
Roswell, A. E. 354-M
Roszbach, G. P. 957-Q
Rote, Franklin B. 131-E, 121-J
Roth, A. 19-E, 169-T
Roth, H. P. 239-M
Roth, Walter 250-S
Rough, Frank A. 190-J, 147-M
Rouse, R. L. 43-N
Roush, R. W. 371-S
Rouze, S. R. 349-M
Rovenskii, G. M. 107-N
Rovinskii, B. M. 434-M
Rowady, Edward P. 122-J
Rowan, Miles J. 26-G
Rowe, Frank 316-E
Rowe, J. A., Jr. 48-R
Rowell, S. W. 69-C
Rowland, J. A. 176-M
Rowland, P. R. 350-L
Roxburgh, J. 184-E
Roy, Earl J. 53-A
Royer, M. B. . 120-A, 6-B, 12-D, 186-D
Royon, Jean 99-L
Rozanov, G. M. 263-T
Rozenfel'd, L. 268-J
Rozet, David 84-K
Ruault, P. 59-S
Rubin, L. 231-R
Rubin, Louis C. 165-L
Rubina, S. I. 76-H

Rubio, A. Ruiz 130-K, 507-K
Ruchhoft, C. C. 158-S
Rückemesser, H. . 100-L, 120-L, 462-L
Rudas, Jaime 341-D
Rudd, H. W. 197-L
Ruddle, R. W. 75-C, 108-E
Rüdiger, Otto 14-H, 308-M
Rudman, P. S. 135-M
Rudolph, Walter . . 29-F, 280-F, 7-G, 162-G, 190-G, 5-L, 303-L, 466-L, 502-L
Rudolph, W. E. 19-B
Rudolphy, E. C. 283-M
Rudorff, D. W. 405-G
Rueckel, W. C. 82-B
Ruff, W. 102-M
Ruge, Jürgen 179-K, 252-K
Ruhenbeck, A. 828-Q
Ruiner, M. 454-L
Rupp, A. F. 158-S
Russell, Allen S. 5-C, 165-K
Russell, Byron 412-K
Russell, E. 617-K
Russell, J. E. . . . 186-F, 620-Q, 844-Q
Russell, Leonard N. 19-C
Russell, R. B. 350-M
Russell, Wilbur D. 278-G
Rutherford, John J. B. 62-S
Rutherford, N. B. 71-L, 135-L, 556-L, 712-L
Rutherford, Roy 60-L
Rutledge, G. P. 160-N
Rutter, J. W. 39-N, 220-N
Ruttmann, Wilhelm 942-Q, 57-R
Rutzler, John E., Jr. 223-P
Ryan, J. J. 579-Q
Rybalko, P. G. 590-K
Rybka, T. E. 93-F
Ryden, Sixten 437-E
Ryder, E. J. 360-P
Rykalin, N. N. 177-J, 321-K
Rylander, Andrew E. 387-G, 40-K, 281-K, 373-S
Rys, P. 566-E

S

Saacke, F. C. 43-J
Saceda, D. F. 505-K
Sacerdote, Roberto 206-N
Sachs, Bruno 583-E
Sachs, George . . . 194-G, 655-Q, 765-Q
Sachs, Mendel 244-M
Sachse, J. F. 116-H
Sada, Pablo 296-A
Sadovskii, V. D. 35-N
Sadowsky, M. A. 695-Q
Saelman, B. 786-Q
Saenz, A. W. 46-M
Saha, Ajit Kumar 453-P
Saidler, A. A. 65-C
Sailor, V. L. 385-P
Saito, Hideo 55-P, 107-Q
Saito, Taiichi 348-M
Saitta, V. F. 421-R
Sakai, Mitsuo 289-P
Sakiyama, Kazutaka 301-R
Saklinskii, V. V. 29-H
Salerno, V. L. 720-Q
Sales, Philip N. 55-B
Salkovitz, E. I. 499-P, 1034-Q
Saller, H. A. 147-M
Salli, I. V. 261-N
Salmas, J. 276-N
Salmon, William H. 536-E, 632-E
Saltman, William M. 120-P
Saltonstall, R. B. 408-L
Salvadori, M. G. 635-Q, 716-Q
Salz, Leon 3-F, 263-F
Salzberg, Hugh W. 157-P
Salzmann. 116-B
Samarin, A. 51-N, 432-P
Samborski, W. J. 144-A
Samis, C. S. 84-B
Samoilov, B. N. 20-P
Sample, C. H. 587-L
Samsonov, G. V. 32-Q
Samuels, L. E. 233-M, 492-Q
Samuelson, D. O. 479-K
Sanches, Joseph A. 597-L
Sanders, Clyde A. 165-E, 283-E
Sanders, D. S. 19-B
Sanders, F. A. 52-A
Sanders, L. W. 20-D
Sanderson, L. 43-V, 64-V, 87-V
Sanderson, M. J. 295-M
Sandes, Maurice C. 72-A
Sandford, E. J. 152-M
Sandor, J. 53-D
Sandoz, G. 79-C, 15-P
Sanford, Albert C. 255-S, 374-S
Sanford, E. A. 143-L, 401-R
Sanford, E. J. 114-H
Sanstrom, Gösta E. 202-G
Santen, G. W. van 21-S
Santos, Tharcisio D. de Souza 22-C, 23-C, 24-C, 25-C, 164-C
Sanyal, B. 418-R, 461-R
Sargeaunt, M. J. 61-E
Sargent, B. W. 173-P
Sarginson, K. 512-P
Sarjant, R. J. 3-D, 260-E
Sarolea, L. 265-N
Satel, E. A. 500-L
Sato, Eisuke 508-E

Sato, Mizuho 20-N
Saubestre, Edw. B. 214-L, 366-L
Sauer, John A. 880-Q
Sauerwald, F. 44-H, 94-H, 112-J
Saulnier, Adrien 367-M
Saunders, Donald F. 295-S
Saunders, E. R. 273-D
Saunders, G. H. 623-L
Saunders, O. A. 16-B
Sautter, Werner 215-R
Savage, Frank K. 410-L
Savage, L. H. W. 86-D, 40-F
Savage, Robert E. 118-A
Savage, Robert L. 223-P
Savage, W. F. 211-K
Savinykh, V. P. 918-Q
Savitskii, E. N. 779-Q
Savornin, France 287-P
Savornin, Jean 287-P
Sawa, Shigeki 35-S
Sawyer, John W. 10-S
Saxe, Van Rensselaer P. 16-K
Sayre, M. F. 329-P
Scafati, Anthony A. 160-J
Scailteur, C. 179-T
Scala, E. 474-P
Scanes, P. 479-R
Scarlott, Charles A. 132-A
Scatchard, George 470-P
Schaaber, Otto 336-P
Schaal, A. 400-M
Schacher, Emil 317-T
Schachinger, Liselotte 337-P
Schachner, Herbert 144-M, 510-M, 412-M
Schack, Carl H. 157-B
Schadel, H. M., Jr. 262-P
Schaefer, Fred C. 9-J, 202-J
Schaefer, Walter E. 534-K
Schaer, A. 567-E
Schafer, Harald 487-P
Schäfer, Rudolf 252-D
Schaffer, Ottomar 216-L
Schaller, Gilbert S. 133-A, 138-E
Schaper, E. L. 555-L, 336-T
Schatz, J. 163-R
Schaufelberger, F. A. 218-J
Schauff, Erich 176-J
Schaus, R. A. 85-L
Scheele, D. C. 338-E
Scheepers, L. 241-L
Scheibe, W. 170-C, 171-C
Scheil, M. A. 259-N
Schleicher, Aladar 576-E
Schleicher, William F. 338-G
Scheichl, Ludwig. 256-R
Scheifele, F. H. 535-L
Scheil, Erich. . . . 430-M, 198-N, 231-N
Scheil, Merril A. 74-V
Schell, Hans Achim 96-N
Schenkel, Willy 185-S
Schepers, J. 297-P
Scherer, Robert 80-J, 30-Q
Scheruhn, W. 664-K
Scheuble, Werner 243-N
Schey, J. 127-C, 214-F
Schickner, W. . . . 289-K, 340-L, 714-L
Schiff, D. 362-P
Schikorr, G. 389-L, 213-R, 214-S
Schill, H. 61-H
Schimz, K. 393-G
Schindler, Albert I. 68-P, 499-P
Schinn, Rudolf . . . 942-Q, 109-S, 242-S
Schippers, Margarete . . . 130-M, 229-M
Schlain, David 299-R
Schlechten, A. W. 9-B, 13-B, 52-B
Schlegel, Heinz 131-M
Schleicher, A. 482-E, 687-K
Schleissner, J. 410-E
Schlichter, Harry G. 37-E
Schlieder, Siegfried 427-P
Schlottenmier, T. J. 394-S
Schmid, E. 82-E
Schmidt, A. O. 315-G, 274-S
Schmidt, H. 409-E, 474-E
Schmidt, W. A. 120-E
Schmidt, Walter . . 378-G, 185-S, 186-S
Schmidt-Bach, Hans . . . 662-K, 704-K
Schmidtmann, Eugen 45-N
Schmittner, W. G. 598-Q
Schmoldt, Hans 204-R
Schnadt, H. H. 1041-Q
Schneeman, Justin G. 196-S
Schneider, Edward 204-L
Schneider, K. 580-E
Schneiderhöhn, Hans 278-M
Schneidewind, Richard 205-Q
Schoch, H. E. 493-E
Schock, G. 425-M
Schoefer, E. A. . . 311-A, 407-R, 240-T
Schoen, F. C. 96-A
Schoening, F. R. L. 66-P
Scholl, Herbert 510-Q
Schoop, Josef . . . 23-D, 204-D, 211-D
Schopp, C. O. 133-E
Schopper, Herwig 429-P
Schor, Harold 110-F
Schore, George 367-L
Schrader, Angelica 54-M, 66-M
Schrader, Carlton D. 237-P
Schram, I. H. 181-K
Schramm, Jacob 32-M, 8-V, 48-V
Schreiber, W. . . . 116-Q, 149-Q, 240-Q
Schreiner, H. 95-H

Schreitz, W. G. 835-P
Schrieder, E. 219-A
Schroeder, H. C. 265-A, 295-K
Schroeder, J. 162-T
Schroth, H. 309-M
Schubert, Konrad 205-M, 311-M, 336-M, 337-M, 372-M
Schuchmann, J. A. 184-Q
Schuermann, R. A. 355-G
Schuhmann, R., Jr. 216-B
Schuldiner, Sigmund 8-P
Schulenburg, A. 203-E
Schulkes, J. A. 271-P
Schüller, Arno 131-M
Schulte, Fritz 209-E, 270-E
Schultze, W. A. 219-J, 241-J
Schultz, Wayne H. 596-L
Schultze, O. 264-A
Schultz-Grunow, Fritz 383-D
Schulz, L. G. 317-P
Schulze, A. 301-P, 346-P, 259-T
Schumacher, G. F. 35-G
Schumacher, Heinz 203-D, 372-D
Schumann, Hermann 229-N, 230-N, 301-N
Schumpelt, K. 37-L
Schurig, W. Fred 222-L
Schürmann, Eberhard 124-B
Schurr, G. 128-L
Schushardt, J. R. 400-E
Schwab, G. M. 768-Q
Schwab, J. 208-R
Schwabe, Everhard 154-P
Schwaigerer, S. 89-Q
Schwandt, Siegfried 393-L
Schwartz, C. M. 385-M, 404-M, 297-Q, 963-Q
Schwartz, H. A. 148-N
Schwartzbart, Harry 970-Q
Schwarz, A. 271-L, 181-T
Schwarz, Carl V. 109-D, 496-P
Schwarz, K. 174-R
Schwarzkopf, Paul . 107-H, 34-V, 51-V
Schwarzkopf, Walter M. 28-H
Schwed, Philip 184-N
Schwedes, W. H. 73-S
Schweissheimer, W. 201-A, 234-K
Schwerdtfeger, W. J. 393-R
Schwerin, C. H. 210-J
Schwier, Fritz 248-T
Schwietzke, G. 259-E
Schwope, Arthur D. 159-N, 791-Q
Scortecci, Antonio 43-A, 284-D
Scott, A. B. 222-A
Scott, C. C. 421-R
Scott, E. Baliol . . 168-A, 169-A, 171-A
Scott, M. R. 154-J
Scott, Reed B. 257-G
Scott, Ursel Baliol 172-A
Scott, W. B. 141-E, 533-E
Scranton, C. J. 341-T
Seaborg, G. T. 331-P
Seabright, L. H. 22-J, 845-Q
Seabrook, S. J. 32-K
Sears, G. W. 222-N
Sears, W. H. 231-R
Seaton, Albert 310-T
Sechler, Ernest E. 44-Q
Sedlatschek, K. 120-B
Seeger, A. 425-M, 63-N, 233-N
Seeger, Karlheinz 428-P
Seelig, Richard P. 286-L
Seelmeyer, Gunther 441-R
Seely, F. B. 120-Q
Seemann, H. E. 3-M
Seemann, H. J. . . 93-N, 178-N, 199-S
Seffern, Owen K. 335-S
Segre, E. 319-P
Segsworth, R. S. 95-J
Seide, Paul 252-Q
Seifert, H. 498-E
Seigle, L. L. 14-P
Seiler, K. 216-P, 465-Q
Seiter, J. Gordon . 406-L, 504-L, 642-L
Seith, W. 2-H, 235-N
Seitz, F. 166-N, 9-Q
Sejournet, J. 298-A, 72-F
Sekal, Johann 473-R
Sekiguchi, Kazuhiko 507-E
Selis, Sidney M. 219-P
Sell, M. T. 127-E
Sellers, P. A. 230-P
Selmecizi, Bela 354-D
Sem, M. O. 325-D
Semenkovich, S. A. 739-L
Semenov, A. P. 22-G, 773-Q
Semonian, Joseph W. 987-Q
Semrau, Cecil F. 501-E
Sen, M. C. 140-B
Senatoroff, N. K. 182-R
Send, Alfred 22-D
Senderoff, Seymour 558-L
Senfter, Eduard 108-D, 210-D
Sengfelder, Georg 28-B
Sennekamp, H. 150-A, 262-A
Septier, Albert 324-M, 365-M
Serdiukov, V. G. 144-G
Sereda, P. J. 296-S
Serfass, Earl J. 56-A, 257-L, 402-L, 411-L, 625-L
Sergeson, Robert 215-D
Servi, Italo S. 166-Q
Severdenko, V. 218-F
Seward, Warren K. 229-G
Seybolt, A. U. 74-M, 298-M

Seymour, E. F. W. 141-P
Seymour, Raymond B. . . . 34-L, 425-R
Shablygin, S. V. 497-K
Shafer, K. D. 372-P
Shaff, B. W. 657-K
Shaller, A. J. 976-Q
Shames, A. 209-Q
Shank, M. E. 609-Q
Shankweiler, Fred K. 383-L
Shanley, F. R. 46-Q
Shannon, J. J. 181-D
Shapiro, G. S. 1021-Q
Sharp, H. J. 174-E
Sharp, M. 10-M
Sharpnack, E. V., Jr. . . . 120-F, 179-F
Sharpnack, E. V., Sr. . . . 261-G, 102-T
Shashkov, A. N. 199-G
Shatalov, A. Ia. 437-P
Shaw, F. M. 51-E
Shaw, Fred D. 227-L
Shaw, G. J. 640-E
Shaw, H. A. 30-C
Shaw, Homer L. 280-P
Shaw, J. D. 54-H
Shaw, John K. 676-L
Shaw, R. B. 978-Q
Shdanow, A. P. 335-P
Shea, W. P. 66-A
Shedden, J. W. 603-K
Sheldon, E. A. 219-N
Sheline, R. K. 250-P
Shelton, S. M. 105-C
Sheng, James 720-Q
Shepard, Mark 346-L
Shepherd, Roland P. 730-Q
Sheptak, Nicholas 295-E
Sherby, Oleg D. 173-Q, 977-Q
Sherman, Monroe 58-F, 265-F
Sherry, N. P. R. 417-P
Shields, Bruce M. 60-S
Shih, C. 98-M
Shimkin, Demitri B. 79-B
Shinn, John 2-K
Shiozawa, Masakazu 389-R
Shirakawa, Yuki 54-P
Shires, F. 397-E
Shirley, H. T. 35-R, 336-R
Shirn, G. A. 308-N
Shivaraman, N. B. 277-L
Shive, John N. 115-T
Shlykov, O. P. 316-N
Shmidman, V. N. 278-K
Shober, F. R. 791-Q
Shockley, W. 143-P, 499-Q
Shoemaker, David P. 294-M
Shoemaker, J. D. 239-G
Shome, S. C. 280-L
Shore, F. J. 366-P
Shorshorov, M. Kh. 177-J
Shoumatoff, Nicholas 16-R
Shraerman, M. R. 323-K
Shreffler, R. G. 81-P, 301-Q
Shreiner, L. A. 68-G
Shroka, H. S. 386-E
Shrubsall, Arthur E. 270-K
Shtol'ts, A. K. 272-N
Shubrooks, G. E. 31-F
Shugar, I. 315-M
Shull, C. G. 151-M, 273-M
Shumann, Frank E. 381-E
Shur, Ia. S. 19-P
Sibert, M. E. 103-C
Sicha, Frantisek, ... 756-Q
Sickels, Edmund D. 79-J
Sidebottom, O. M. . 395-Q, 398-Q, 745-Q
Sidhu, S. S. 4-M
Siebel, E. 879-Q
Siebel, Gustav 110-C, 460-Q
Siebel, M. P. L. 563-Q, 564-Q
Sieber, Karl 119-F
Siebert, W. H. 158-E, 543-E
Sieg, W. W. 89-A
Siegel, Heinz 63-D, 647-E
Siegel, Sidney 390-P
Siegenthaler, A. 389-K
Siegenthuler, H. 246-K
Siegfried, W. . . . 267-N, 158-Q, 290-Q
Siemon, Karl 233-T
Siemonsen, H. 77-P
Siemonsen, U. 77-P
Siepmann, Heinrich 43-H
Sietnieks, Alfreds J. 132-S
Sigler, W. P. 92-T
Signora, Mario 38-D, 65-D
Sikora, Paul F. 21-Q
Silk, Edmond J. 58-J
Silliman, Leo R. 209-F
Silman, H. . . 91-L, 345-L, 635-L, 656-L
Silva, Luiz C. Correa da . . 25-C, 38-N
Silverman, L. 258-P
Silvidi, A. A. 23-P
Simison, T. G. 273-L
Simmie, W. S. 304-K
Simmons, E. L. 149-P
Simmons, H. E. 245-E
Simmons, M. L. 459-L
Simmons, O. W. . . 67-C, 197-E, 471-Q
Simnad, M. T. 193-B, 1051-Q
Simon, A. C. 34-N, 291-N, 51-R
Simon, I. 80-P
Simonds, H. R. 70-T, 99-T
Simons, Eric N. 536-E, 632-E, 695-K, 589-K, 95-M
Simonsen, E. Bull 236-L

Simpkinson, T. V. 21-M, 85-M
Simpson, O. C. 160-P
Simrnov, S. P. 511-P
Sims, C. E. 147-N
Sims, R. B. 11-F, 658-Q,
. . . . 795-Q, 39-S, 52-S, 142-S, 143-S
Sinclair, G. M. 618-M, 746-Q
Sine, J. D. 259-S
Singdale, Fred N. 677-Q
Singer, A. R. E. 106-S
Sinnamon, G. K. 610-Q
Sinnott, M. J. 409-P, 174-Q
Sipp, E. F., Jr. 251-T
Sippell, K. W. 102-G
Sissener, John. 156-E, 421-E
Sistiaga, José Maria . . . 200-K, 444-K
Sivertsen, J. M. 317-Q
Sixt, Benno 667-K
Sjöberg, Sven 119-N
Skaggs, L. S. 222-S
Skaupy, F. 90-H
Skei, T. 192-R, 293-R
Skerry, E. W. 430-L, 679-L
Skinner, K. G. 43-B
Skinner, Selby M. 223-P
Skolnik, Merrill 120-K, 229-K
Skopinski, T. H. 916-Q
Skorniakov, N. N. 317-N
Skotnicki, T. J. 414-L
Skow, Norman A. 302-T
Skulari, Petr. 755-Q
Skutta, T. 290-L
Slade, C. E. 567-K
Slade, Frank H. 28-D, 42-S
Sladek, R. J. 43-M, 316-Q
Slairetam, M. A. 317-S
Slätis, Hilding 213-P
Slaughter, G. M. 478-K
Slavin, Abraham 573-Q
Slawson, R. J. 570-L
Slesarchuk, G. P. 397-G
Slichter, W. P. 189-N
Slifkin, L. 25-N
Slifko, Michael 179-D
Sloan, Alvin 191-Q
Slocum, G. L. 346-T
Sloman, H. A. 21-D, 295-D
Slunder, C. J. 385-R, 386-R
Smakula, Alexander 53-N
Smallman, R. E. . . 259-M, 307-N, 315-Q
Smallman-Tew, R. 86-T
Smallwood, J. E. 578-L
Smart, G. 609-E
Smart, J. Samuel 382-P
Smart, J. S., Jr. 60-C, 229-P
Smedley, Carl R. 674-L
Smekal, A. 370-G, 314-M
Smellie, W. J. 205-K
Smelt, J. A. M. 227-T
Smirnov, A. V. 739-L
Smirnova, I. N. 241-N
Smirnova, K. 461-E
Smislova, A. 310-Q
Smith, A. D. N. 453-Q
Smith, Andrew W. 279-F
Smith, Arthur Q. . . . . .
. . . . . 208-E, 224-F, 195-J, 377-K
Smith, B. M. 32-S
Smith, B. W. 177-P
Smith, Cecil O. 186-R
Smith, Clark J. 365-S
Smith, Cyril Stanley. . . . . .
. . . . . .230-A, 45-M, 125-M,
. . . 214-M, 419-M, 7-P, 354-P, 161-Q
Smith, D. P. 147-N
Smith, E. 409-R, 427-R
Smith, E. M. 79-L, 545-L
Smith, F. R. 154-D
Smith, Frank C. 256-Q
Smith, F. T. 28-L
Smith, G. C. 365-Q
Smith, G. V. 288-N, 653-Q
Smith, Hans W. 610-K
Smith, H. L. 310-E
Smith, James Boyd 191-L
Smith, James H. . 349-E, 375-E, 442-E
Smith, J. O. 120-Q, 543-Q
Smith, J. T. 109-P
Smith, Kenneth M. 75-A
Smith, L. W. 435-K
Smith, L. W. L. 200-N
Smith, P. L. 339-P
Smith, R. A. 109-M
Smith, R. L. 972-Q
Smith, R. P. 313-N
Smith, S. E. 154-K
Smith, S. J. 72-D
Smith, S. S. 211-K
Smith, T. S. 26-P, 103-P
Smith, V. W. 598-E
Smith, W. K. 279-N
Smith, W. S. 201-M
Smithgall, Harry M. 34-G
Smolczyk, H. G. 305-P
Snape, Alfred L. 232-S
Sneddon, I. M. 345-Q
Sneddon, R. 379-K, 150-L, 72-V
Snook, J. M. 416-M
Snow, A. L. 194-P
Snow, R. B. 256-D
Snowdon, S. C. 323-P
Snyder, Frederick B. 484-R
Snyder, H. J. 619-Q
Snyder, W. A. 60-E

Sobers, W. B. 308-E
Sobolev, N. D. 775-Q
Soderlund, C. G. 499-E
Soete, A. 147-Q
Sohn, J. 654-K
Soisson, R. 78-D
Sokolowa, S. S. 335-P
Solar, F. 392-L, 690-L, 214-P
Solianik-Krassa, K. V. 91-Q
Solomon, J. G. 526-K
Someren, E. Van. 258-K
Sommer, A. H. 163-D
Sommer, Gordon M. 334-G
Sonnemann, George 515-Q
Sorem, S. S. 91-S
Sorenson, B. M. 386-P
Soretz, Stefan 666-K
Sorin, Pierre 287-G
Sorkin, George 237-S
Soundy, G. W. 6-L
Southworth, Howard 302-S
Souza Santos, Tharcisio D. de . . . .
. . . . . 130-C, 176-C, 177-C
Sovalova, A. A. 192-N
Spagnola, Ralph 181-J
Spangler, G. 972-Q
Spangler, F. L. 41-J
Spath, W. . . . 153-G, 186-G, 218-G,
. . . . 362-G, 449-P, 466-P, 243-Q,
. 292-Q, 436-Q, 998-Q, 1017-Q, 1038-Q
Spaulding, H. K. 77-C
Spear, Peter 1051-Q
Spedden, H. R. 268-S
Spedding, F. H. 81-C, 155-C,
. . . . . 22-P, 196-P, 384-P, 502-P
Speich, G. R. 116-N, 173-N
Speiser, Rudolph . . . . . .
. .115-M, 387-M, 390-M, 280-N, 133-P
Speiser, Walter 482-Q
Speith, K. G. 96-D, 111-D, 25-S
Spenceley, W. S. 312-E
Spencer, Charles C. 105-E
Spencer, K. A. . . . 323-L, 244-R, 458-R
Spencer, L. F. . . 41-E, 123-F, 136-F,
. .15-G, 50-G, 117-G, 215-G, 335-G,
. . . 336-G, 354-G, 70-J, 85-J, 87-J,
. 114-J, 173-J, 241-K, 336-K, 436-K,
. . 566-K, 646-K, 671-K, 679-K, 193-L
Spencer-Strong, G. H. 586-L
Sperner, Franz 179-N
Spicer, Frank 80-L, 234-L, 341-L, 434-L
Spicer, William M. 276-P
Spielvogel, W. 20-C
Spies, C. J. 265-Q
Spirytus, Jacques 253-A
Splettstosser, H. R. 3-M
Splittgerber, A. 145-R
Spooner, H. 536-Q
Spooner, Norman 252-R
Spooner, R. C. 194-L
Spratt, D. A. 41-P
Spray, K. E. 136-E
Sprenger, Harribald 277-R
Spretnak, J. W. . . . . .
. . . . . .115-M, 387-M, 390-M, 280-N
Spring, S. 36-L
Springer, Richard 296-L, 316-L
Springorum, Friedrich Alfred . . 111-D
Spronck, R. 412-Q, 827-Q
Sprowls, D. O. . . . 420-R, 428-R, 463-R
Spurgeon, J. C. 279-K
Squarcy, Charles M. 188-D
Squitero, Almo D. 37-L
Sreenath, L. S. 661-Q
Srikantiah, B. S. 48-M
Srinath, L. S. 394-Q
St. Andre, Joe 53-T
St. Minc 447-R
St. Pierre, P. D. S. 26-B
Staats, Henry N. 388-S
Stacey, F. D. 150-P
Stacey, R. D. 279-M
Stadelmann, W. 160-T
Stäger, Hans 67-S
Stagg, Lee J. 10-P
Stahl, P. 238-N
Stahl, Wolfgang 99-C
Stakleisen, Verlag 57-D
Stalhed, John 323-D
Stam, W. van 78-E
Stammbach, M. 22-F
Standell, P. O. 200-F
Standing, S. A. 346-S
Stanley, F. B. 352-G
Stanners, J. F. 143-R
Stansbury, E. E. 60-N
Stanton, Robert B. 187-G, 218-S
Staples, R. T. 186-E
Stapleton, J. M. 288-D
Stareck, J. E. 621-L
Starikovich, S. A. 501-K
Stark, B. V. 105-D
Stark, C. F. 485-R
Stark, K. 301-L
Stark, Ulrich 89-R
Starkey, R. D. 333-Q, 342-Q
Starr, C. Dean. . . 85-N, 403-Q, 978-Q
Starr, John. 64-G, 15-J,
. . . . . .61-K, 177-L, 226-L, 386-S
Staugaitis, C. L. 907-Q
Stauss, H. E. 79-C, 15-P
Stavely, E. B., Jr. 371-S
Staverman, A. J. 937-Q
Stazinski, J. B. 533-E

Stead, David D. 329-T, 112-V
Stearley, G. H. 179-P
Stebbins, A. K. 269-P
Stedfeld, Robert L. 125-L, 981-Q
Steed, R. W. 128-Q
Steenis, O. L. van 227-T
Steer, A. T. 458-L
Stefec, Rudolf 342-D
Stegmaier, W. 147-E
Steijn, R. P. 969-Q
Steinberg, M. A. 103-C, 50-M
Steiner, G. 187-J, 538-L
Steiner, Julius 121-L, 454-L
Steinheider, Wilt H. 162-D
Steinhoff, H. E. 256-S
Steinitz, Robert 26-H, 65-H
Steinrath, Heinrich 440-R
Stelljes, H. A. J. 197-G, 289-G
Stempfel, G. E. 50-J
Stempfl, A. 413-M
Stenoien, J. O. 405-P, 100-T
Stepanov-Grebennikov, N. M. . . . 275-K
Stephens, F. M., Jr. . . . 121-B, 189-B
Stephens, H. A. 113-E
Stephens, W. W. 56-C, 70-V
Stephenson, B. E. 933-Q
Stephenson, Henson K. 1011-Q
Stephenson, Lee 10-R
Stephenson, R. L. 67-B
Stephenson, Robert 258-D
Stern, F. B., Jr. 267-S
Stern, George 69-H
Stern, I. L. 261-K
Stern, Max 131-T
Sternberg, E. 695-Q
Sterns, Lorance 23-S
Steven, W. 151-N
Stevens, C. W. 40-J
Stevens, L. G. 65-T
Stevens, Peter 214-T
Steward, K. 129-T
Stewart, D. R. 81-V
Stewart, R. S. 230-D
Stewart, W. C. 835-Q
Stewart, W. D. 234-S
Stewart, W. F. 505-L
Stewartson, R. 41-F
Stieler, C. 477-E
Stieri, Emanuele 247-K
Stiles, F. J. 7-K
Stine, V. F. 413-L
Stobbart, John B. 341-R
Stockett, Norman A. 95-B
Stockton, F. D. 606-Q
Stokely, J. M. 248-G
Stokey, William F. 592-Q
Stokowiec, Z. 546-E, 614-E
Stone, C. A. 179-S
Stone, F. S. 128-P
Stone, Irving 8-F, 43-G, 26-T, 293-T, 95-V
Stone, M. D. 39-F, 89-F, 262-J
Stone, R. H. 534-E
Stone, Wayne 245-G, 602-L
Stoner, Edmund C. 188-P
Storchheim, Samuel . . . 80-F, 126-G, 136-G, 203-J, 339-M, 864-Q
Storcks 367-K
Storey, O. W. 177-G
Stormont, D. H. 196-L
Stott, B. L. 338-T
Stout, J. W. 1-P, 2-P
Stout, R. D. 57-E, 118-K, 637-K, 656-K, 142-Q
Stowasser, William F., Jr. 22-B
Strachen, K. G. A. 133-R
Strahuber, Franz 22-D
Straight, Paul J. 468-L
Strasser, Federico . . . 72-G, 140-G, 178-G, 220-G, 277-G, 310-G, 103-K
Stratton, R. 203-M
Straub, Frederick G. 77-R
Strauch, K. 268-P
Strauss, Jerome 343-S
Strauss, R. W. 292-L
Strauss, S. D. 279-A
Streicher, Michael A. 126-R
Strickland, A. C. 512-P
Strieter, F. P. 207-Q, 302-Q
Stringer, J. 40-F
Strippes, M. 708-Q
Strod, A. J. 88-B
Stroh, A. N. 61-M, 420-P
Strohfeld, W. 317-M
Ström, B. I. 35-F
Stromberg, A. G. 240-N
Stromquist, D. M. 55-A
Stross, W. 200-S
Stroud, E. G. 338-R
Strow, Henry A. 37-L
Struyk, C. 37-L
Stubbs, Paul B. 258-D
Stubbs, R. Lewis . 142-A, 278-A, 471-L
Stuebing, A. F. 312-T
Stuhlmann, Walter 261-T
Stukel, J. E. 187-D
Stumpf, Karl Ernst 191-S
Sturdy, G. E. 209-R
Sturm, R. G. 96-F
Sturney, A. C. 38-A
Sucksmith, W. 44-P, 189-P, 483-P
Sudrabin, L. P. 176-R
Suffolk, S. F. 12-S
Sugarman, Nathan 236-P

Sugg, Ronald E. 337-S
Suhl, Harry 350-P
Suhrmann, R. 467-P
Suiter, J. W. 80-Q
Sukhobokova, N. V. 238-R
Sullivan, C. J. 343-K
Sullivan, J. D. 71-B
Sully, A. H. 495-L, 308-Q, 663-Q, 664-Q
Sultan, F. S. A. 31-N
Summer, James R. 530-K
Summers-Gill, R. G. 174-P
Sumsion, H. T. 74-M, 298-M
Sun, Shiou-Chuan 92-B
Sundaram, C. V. 38-C
Sunden, N. 254-P
Surikov, B. 32-A
Surovtseva, E. D. 238-R
Sussman, Sidney 466-R
Sutherland, N. 311-L
Sutra, Genevieve 325-M, 447-P
Sutton, Paul M. 928-Q
Sutton, R. S. 1003-Q
Svenningsen, A. P. 19-B
Svensson, I. 14-Q
Sventshansky, A. D. 556-E
Svirbely, W. J. 219-P
Sviridova, Z. A. 129-P
Swain, A. J. 667-Q, 317-R
Swaine, D. J. 371-R
Swainson, E. 69-C
Swallow, W. J. 331-G
Swan, J. B. 247-P
Swan, Sydney 469-K
Swan, Vernon 516-E
Swaney, F. S. 130-D, 72-S
Swanson, C. J. 666-L, 701-L
Swanson, Howard E. 383-M
Sweeney, E. F. 141-Q
Sweeny, W. O. 235-S
Sweet, J. W. 58-T
Sweetland, E. D. 445-Q
Sweo, B. J. 459-L, 959-Q
Swerdlow, N. 36-T
Swift, H. W. 98-G, 17-Q, 49-Q
Swindin, Norman 264-L
Swinyard, G. 264-E
Syeles, Albert M. 6-P
Syer, C. Raymond, Sr. 112-L
Sykes, C. 29-V
Sykes, J. 49-C
Syre, R. 220-J
Szabo, Odon 411-M, 949-Q
Szczeniowski, J. 69-D
Szekeres, Janos 483-E
Szeki, J. 126-C
Szelwach, S. 452-E
Szemere, Janos 400-K
Szentivanyi, Gyula 135-C
Szymanski, A. 258-T

T

Tabor, D. 452-Q, 1051-Q
Tajima, Sakae 52-L, 613-L
Takagi, Noboru 97-S
Takahashi, Noboru 94-M, 367-M
Takahashi, Yoshikazu 27-B
Takahaski, Noboru 301-M, 228-N, 457-Q
Talbot, H. L. 143-C
Talbot, Jean 244-N
Talbott, F. L. 244-P
Talmage, R. 63-H
Tame, K. E. 44-B
Tanczyn, H. 353-Q
Tanenbaum, M. 233-P
Tangerman, E. J. 152-T
Tanuma, Seiichi 57-P
Tanzola, W. A. 161-R
Tapsell, H. J. 851-Q
Taraldsen, Alf 861-Q
Tarian, G. 163-B
Tarjan, Gusztav 135-B, 231-B
Tarring, L. H. 167-A
Tatge, Eleanor 383-M
Tator, Kenneth 29-L
Taurel, Lucienne 138-N
Tavard, M. 275-D
Tavernier 134-S
Taylor, A. 76-F, 141-F, 186-M
Taylor, A. E. 512-P
Taylor, B. J. 2-E
Taylor, C. A. 160-M
Taylor, C. R. 89-D
Taylor, Cyril S. 5-C
Taylor, D. A. 419-E
Taylor, E. A. 647-K
Taylor, E. Wilfred 162-M, 187-M
Taylor, G. 166-G
Taylor, H. A. 385-E
Taylor, H. F. 9-A, 120-E,
.130-E, 140-E, 145-E, 590-E, 616-E,
. . 638-E, 182-N, 210-Q, 211-Q, 472-Q
Taylor, I. J. 588-Q
Taylor, J. 50-D, 94-D,
. . . . . 121-D, 193-D, 546-E, 614-E
Taylor, Jack L. 80-M
Taylor, R. D. 2-R, 246-R
Taylor, Robert R. 74-F
Taylor, R. W. 224-K, 600-K
Taylor, W. E. 19-C, 3-P
Taylor, W. J. 390-M, 340-Q
Tear, H. L. 139-A
Tebble, R. S. 462-P
Tedds, D. F. B. 266-E

Teed, P. L. 884-Q, 75-T, 52-V
Teeple, H. O. 325-R, 361-R
Teeters, Wilber O. 165-L
Tekht, V. P. 314-Q
Tekst, V. P. 774-Q
Teltow, J. 304-M
Templeton, D. H. 256-M
Tendam, D. J. 269-P, 270-P
Tenenbaum, M. 161-D
Tenney, Gerold H. 30-S
Tenot, A. 644-Q
Terekhova, V. F. 779-Q
Terry, Glenn 68-C
Terry, R. M. 514-L
Testro, H. J. 212-L, 557-L
Tetzlaff, Erwin G. 73-A
Teworte, Wilhelm 249-S
Texter, H. G. 20-S, 102-S
Thayer, Starr 170-R, 228-R, 296-R, 321-R, 396-R
Thedieck, Reiner 468-P, 469-P
Theis, Erich 437-Q
Theron, J. J. 172-S
Thewlis, J. 17-M, 184-M, 258-M
Thews, E. R. 300-A, 355-E, 300-L
Thibadeau, A. T. 457-L, 638-L
Thibault, N. W. 214-G, 345-G
Thiede, R. C. 187-R
Thiel, G. 153-Q
Thielsch, Helmut . 618-E, 153-K, 297-K
Thierry, Paul 210-B, 98-D, 99-D, 282-D, 363-D
Thirsk, H. R. 98-L, 325-L, 668-L, 490-P
Thode, H. G. 177-P, 267-P
Thoenen, J. R. 202-B
Thom, Clarence 159-B
Thomas, A. H. 468-R
Thomas, C. S. 190-F
Thomas, D. E. 331-Q, 332-Q
Thomas, D. G. B. 95-Q
Thomas, Dorsey Blalock 438-K
Thomas, E. E. 179-M
Thomas, G. Barry. 91-F
Thomas, J. M. 934-Q, 252-R
Thomas, R. J. 588-L
Thomas, R. L. 35-B, 37-B, 39-B
Thomas, Robert 381-K, 650-K
Thomas, T. Y. 408-Q, 409-Q, 410-Q
Thomas, W. E. 63-S
Thomas, W. R. 281-R
Thomassen, L. 934-Q, 252-R
Thompson, F. C. . . 75-F, 133-F, 188-M
Thompson, F. W. 65-N, 119-R
Thompson, Garth 614-K, 619-K
Thompson, H. C. 44-K
Thompson, J. E. 189-P
Thompson, J. M. 356-S
Thompson, N. 245-M
Thompson, Sanford P. 685-Q
Thompson, W. E. 118-P
Thomsen, E. G. 21-G
Thomson, A. G. 3-A, 175-A, 179-A, 180-R
Thomson, R. F. 59-R
Thomson, Richard B. 55-H
Thon, N. 369-S
Thorn, R. J. 160-P
Thorne, J. P. 116-K
Thorne, R. L. 200-B
Thornley, J. L. 355-R
Thorpe, R. G. 119-E
Thorwart, W. 140-J
Thring, M. W. 16-B
Thrysin, Erik 62-K
Thum, A. .87-Q, 156-Q, 1019-Q, 1040-Q
Thum, E. E. 94-V
Thurber, W. F. 168-G
Thurlimann, Bruno 709-Q
Thurlow, G. G. 12-R
Thwaites, C. J. 41-N
Thyer, E. G. S. 110-B
Ticknor, L. B. 163-P
Tiedema, T. J. 92-N
Tikhomiroff, Nicolas 183-S
Tiley, P. F. 128-P
Tiller, W. A. 220-N
Tillman, J. R. 411-P
Tillu, Mahadeo M. 251-R
Tilney, Richard 711-L
Timmerbeil, H. 146-R
Timoshenko, Stephen P. 469-Q
Tipler, H. R. 513-Q
Tipper, A. 96-E
Tipper, C. F. 613-Q
Tobias, C. W. 11-P
Tobias, Peter S. 180-G
Tobisawa, Shotaro. 57-P
Tod, C. W. 307-R
Tödt, F. 334-L
Toeldte, W. 730-L
Toghill, E. C. 358-T
Tolansky, S. 299-P, 1051-Q, 339-T
Tomizuka, T. 25-N
Tomlinson, J. E. 648-K
Tomlinson, J. W. 96-B, 154-B
Tommasini, A. R. 132-T
Tompkin, J. E. R. 272-E
Tompkins, F. C. 342-P, 343-P
Tordeux, Jacqueline 93-M
Toropov, V. A. 282-G
Totta, Paul A. 923-Q
Tottle, L. G. 105-M
Toulmin, H. A., Jr. 109-A
Tour, Sam . . . 597-E, 224-L, 66-N, 1-T

Towler, F. H. 169-F
Towler, J. M. 169-F
Towner, J. 92-L
Townsend, J. R. 227-A
Tracy, Gordon S. 159-F
Trägardh, Uno 384-L
Tragner, Erich 1043-Q
Tranter, G. D. 4-D
Trapnell, B. M. W. 452-P
Treco, R. M. 81-M
Trefny, Franz 77-B
Treichler, F. 188-J
Tremaine, R. L. 87-D
Tremlett, H. F. 264-K
Trentini, B. 370-D
Treseder, R. S. 242-R
Trevithick, T. H. 98-E
Trillat, Jean-Jacques 94-M, 301-M, 367-M, 228-N
Trinks, W. 211-F, 81-R
Tripmacher, R. 97-C
Tripoli, Philip 360-E
Trishman, L. E. 201-Q
Trocki, Thomas 186-T
Troiano, A. R. 101-D, 968-Q
Trombe, F. 484-P, 485-P
Trommer, W. 348-E, 463-Q
Troost, A. 115-Q, 151-Q
Troyanowsky, Clement 283-P
Truckenmiller, W. C. 221-G
Truell, R. 39-P, 198-P, 231-P
Truman, J. E. 35-R
Trumbore, F. 334-P
Trupel, F. 338-M
Tsang, S. 142-Q
Tsiersch, Ya. Ya. 144-G
Tsutsumi, Nobuhisa 247-N
Tsuya, K. 64-Q
Tsuya, Noboru 56-P
Tubbs, W. H. 364-D
Tucker, A. J. P. 528-K, 333-R
Tucker, C. W., Jr. 298-M
Tucker, G. E. G. 58-M
Tucker, H. J. 101-J
Tucker, W. C. 54-F
Tull, E. V. 201-N
Tulloch, Jerome D. 604-L
Tunstead, J. 147-P
Tupper, S. J. 321-Q, 323-Q, 324-Q, 325-Q, 328-Q, 737-Q, 797-Q
Turk, F. L. 69-N
Turkdogan, E. T. 103-D
Turnbull, D. . .27-N, 88-N, 163-N, 190-N
Turnbull, J. C. 558-L
Turner, C. A., Jr. 2-J, 45-J
Turner, Dennis R. 90-L
Turner, D. H. 131-C
Turner, G. H. 44-C
Turnock, E. H. 587-K
Tuthill, R. W. 573-K
Tylecote, R. F. 334-R
Tyler, E. S. 60-J
Tyler, W. W. 475-P, 888-Q
Tyrrell, M. E. 43-B
Tytgat, D. 153-C
Tyvaert, P. 59-L
Tzyganova, M. P. 113-G

U

Ubbelohde, A. R. 65-N, 119-R
Uberall, Herbert 338-P
Udin, Harry 579-K, 84-P
Udotov, K. A. 322-K
Udy, Murray C. 280-P
Ueda, Ryuzo 292-M
Ueda, Shigetomo 839-Q
Ueno, M. 64-Q
Uetz, H. 945-Q, 999-Q
Uhleen, Arthur E. 39-G
Uhlig, Herbert H. 206-L, 158-P, 137-R, 195-R
Ukshe, E. A. 393-P
Ulmer, Georges 123-E, 455-E
Ulmer, M. G. 87-E
Ulmer, P. F. 133-E
Ulmer, R. C. 18-R
Ulmo, Jeanine 938-Q
Umstätter, H. 763-Q
Unckel, H. A. 29-M, 883-Q
Underwood, A. F. 260-S
Unger, Henry F. 42-T
Upton, P. B. G. 6-L
Urie, V. M. 20-Q
Utley, Elmer C., Jr. 1012-Q
Uxa, Alois 347-D

V

Vaage, E. F. 351-P
Vagner, G. 93-V
Vainberg, G. S. 459-E
Vaisman, I. A. 358-M
Vajda, John 519-Q, 961-Q
Vajda, S. 107-A
Vajna, A. 57-C
Valentine, K. B. 149-J
Valentiner, Siegfried . . . 191-M, 312-M
Valeur, Jacques 28-Q
Valter, J. 623-K
Van Arsdale, George D. 29-B
Van Bueren, H. G. 195-M, 510-P, 754-Q
Van Camp, George 7-J
Vanden Berg, Russell V. . 441-L, 673-L

Vandenburgh, F. H. 366-E
Vanderbeck, R. W. 682-Q
van der Burgt, C. M. 330-P
van der Hoeven, H. W. 235-T
van der Maesen, F. 491-P
Vandermeeresche, G. 183-M
Vanderploeg, Elmer J. 356-G
van der Veen, J. H. 164-Q
Vanderveer, William R. 90-K
van der Vlugt, L. S. 83-R
Van Embden, H. J. Meerkamp . . 227-T
Van Emden, E. 912-Q
Van Etten, F. M. 217-L
Van Gerven, L. 297-P
Van Horn, Kent R. 152-B, 560-L, 245-Q
Van Horn, R. H. 402-K
Van Horn, Wendell 457-P
Vanick, J. S. 606-E
Van Impe, J. 153-C
Van Itterbeek, A. 297-P, 1037-Q
Van Loo, M. 374-R
van Maanen, J. J. L. . . . 412-Q, 827-Q
Van Mater, Laurance F. 3-J
Van Niekerk, J. N. 66-P
Van Nouhuys, H. C. 168-R
Van Order, Dean 84-F
van Ouwerker, L. 287-S
Van Rysselberghe, Pierre 137-P
Van Santen, G. W. 957-Q
Van Santen, J. H. 440-P
Van Slyke, W. R. 81-B
Van Someren, E. 258-K
van Steenis, O. L. 227-T
Van Thyne, R. J. . 131-C, 173-M, 353-M
van Wieringen, A. 491-P
van Wieringen, J. S. 272-P
Van Wijk, F. 289-Q
van Winkle, D. M. 369-M
Varga, Ferenc 814-Q
Varnerin, L. J., Jr. 477-P
Varskaya, A. K. 251-D
Vartiainen, O. 170-B
Vassamillet, Lawrence 146-Q
Vasta, John 16-Q
Vath, A. 150-A
Vaughn, R. L. 257-G
Vaupel, Otto 435-Q, 27-S, 247-S
Vaux, George 284-M
Veiock, L. H. 195-S
Veit, Pater L. 35-L
Vekony, Sandor 485-E
Vekua, I. N. 488-Q
Venturini, Jean 391-P
Vera, R. 264-M
Vereshchagin, L. F. 497-P
Verlee, P. J. 682-K
Vermilyea, D. A. 373-L
Vernon, W. H. J. 136-R, 257-R, 454-R, 460-R
Vernon-Smith, Sheila 47-M
Vershinski, S. V. 1047-Q
Vetter, F. A. 348-P
Vetter, Klaus J. 490-R
Vibrac, Jean 381-D
Vicars, E. C. 85-N
Vickery, R. C. 98-V
Victor, Maurice 245-T, 246-T
Vidal, Georges . . . 37-J, 44-N, 356-Q
Videau, J. P. 386-K
Vidmajer, A. 33-H
Vidosic, J. P. 203-Q, 309-Q
Vigness, I. 591-Q
Vilez, Marcel 49-J
Villner, L. 83-E
Vincent, E. T. 75-Q
Visin, Robert J. 57-H
Visnyovszky, Laszlo 377-D
Vitelli, Vito J. 262-F
Vitovec, F. 430-P
Voce, E. 30-V
Vogel, F. L., Jr. 179-M, 405-Q
Vogel, Rudolf 219-M, 247-M, 307-M, 375-M, 399-M
Vogt, William A. 100-F
Voice, E. W. 130-B
Voiutskii, S. S. 76-H
Vokral, James F. 571-L
Voldrich, C. B. 269-K, 422-K
Volgelsang, C. A. 259-S
Volkert, G. 220-B
Volkov, S. D. 31-Q
Volkov, S. S. 217-F, 785-Q
Vollers, C. 64-K
Volodin, P. S. 325-K
Volodin, V. S. 324-K
Volovik, B. E. 117-A
Volterra, Enricho 550-Q
Von Bernhard 535-L
von Burg, F. 140-C
von Hofe, H. 627-K
von Hofsten, G. 151-B
von Jurgensonn. 958-Q
von Kannen, Ernst 217-J
Von Ludwig, Davidlee 229-E, 345-E, 548-E
von Meysenbug, C. M. 1015-Q
Von Preen, Wolfgang . . . 257-E, 434-E
von Zeerleder, A. 96-H
Voress, Hugh E. 308-A
Vorob'ev, V. G. 194-N
Voronin, I. V. 499-K
Voshchanov, K. 500-K
Vösskuhler, Hugo 231-M
Votava, E. 264-N

Vreeland, T., Jr. 749-Q
Vucetich, Danilo 314-D

W

Waber, J. T. 124-R, 209-R
Waber, S. F. 124-R
Wachtell, R. 120-M
Wachter, A. 192-R
Wade, F. 217-S
Wadleigh, K. H. 224-T
Waelterman, F. A. 175-L
Wagener, S. 40-H
Wagner, John C. 252-G
Wagner, R. H. 181-R, 481-R
Wagstaff, J. B. 192-D, 244-D
Wahlberg, T. 49-D, 115-D
Wahlin, H. B. 52-N
Wahlquist, H. W. 384-R
Wain, H. L. 20-Q, 575-Q
Wainer, E. 103-C
Wainwright, R. M. 5-R, 74-R, 168-R, 415-R
Wajda, E. S. 308-N
Wakefield, Ernest H. 136-S
Wakelin, R. J. 84-N
Walde, Herman 316-D
Walden, E. 908-Q
Walden, Kenneth E. 17-L
Waldenmeyer, Frank L. 100-E
Waldvogel, R. K. 423-K
Walker, A. G. 57-K, 544-K
Walker, C. 188-G
Walker, C. B. 312-N
Walker, Charles A. 56-A, 147-A
Walker, D. G. 818-Q
Walker, H. L. 30-N, 154-N, 22-Q
Walker, J. G. 102-P
Walker, P. B. 176-Q
Walker, R. F. 3-R
Walker, W. H. 267-P
Walker, W. S. 365-D
Wallace, E. W. 227-R, 390-R
Wallace, P. R. 339-R
Wallace, Robert A. 90-K
Wallace, W. E. 354-P
Wallbank, A. W. 476-L
Waller, B. G. 35-F
Walley, John R. 76-A
Walley, J. W. 279-S
Walling, J. C. 121-P
Wallis, W. B. 368-D
Wallmann, Karl 144-F
Walsh, J. M. 301-Q
Walsh, W. L. 595-Q
Walt, M. 183-P
Walter, A. 314-L
Walter, G. W. 36-L
Walter, Leo 307-A, 49-G, 148-J, 252-J, 135-K, 149-L, 469-L, 148-S, 372-S
Walter, Paul 377-P
Walter, R. J. 179-G
Walters, B. 50-C, 156-C
Walters, N. E. 13-S
Walters, Wilbur S. 28-E
Walton, Charles F. 63-E
Walton, C. J. . . . 420-R, 428-R, 463-R
Walton, C. S. 287-N
Walton, J. D., Jr. 959-Q
Walton, J. L. 151-D
Walton, R. F. 473-L
Walton, W. A. 131-D, 378-D
Walton, William F. 622-L
Walzel, R. 307-D, 769-Q
Wanders, H. H. 66-A
Wannier, Gregory H. 1-N
Wapstra, A. H. 344-P
Warburton-Brown, D. 568-K
Ward, A. F. H. 431-R
Ward, Donald R. 158-S
Ward, J. O. 195-Q, 1006-Q
Ward, M. V. 982-Q
Warekois, E. P. 669-Q
Wargo, John 561-K
Warner, W. L. 357-K
Warnke, W. E. 75-B
Warnock, Harold H. 171-F
Warren, B. E. . . . 271-M, 162-Q, 669-Q
Warren, S. Power 195-B
Warren, W. D. 19-K
Warren, W. G. . . . 122-G, 187-Q, 860-Q
Warring, R. H. 30-B, 340-G, 108-H, 574-L, 631-L, 569-Q, 848-Q, 906-Q, 215-T
Wartenberg, H. v. 442-R
Washburn, Edward 39-L
Washburn, J. 110-N, 256-N, 637-Q, 898-Q, 899-Q
Wasco, J. L. 20-R
Wason, Robert A. 716-L
Wasow, H. 37-C
Wassenaar, T. 442-P
Wasserman, Rene D. 72-K
Wassilieff, B. 88-G
Watanabe, Denjiro 11-N
Watanabe, Masaru 292-M
Waterhouse, R. B. 495-L
Waters, B. H. C. 10-C, 62-C
Waters, F. O. 19-R
Waterton, F. W. 150-S
Watkins, E. R. 37-G
Watson, John H. L. 349-M
Watson, S. J. 244-J

Watson, T. R. B. 459-R
Watson, T. T. 185-L
Watt, W. 117-H
Watts, H. V. 179-S
Watts, R. S. 162-J
Waugh, John L. T. 291-M
Weaver, C. W. 227-Q
Weaver, E. W. 250-J
Weaver, F. D. 355-S
Weaver, Wade R. 78-S, 105-S
Webber, H. M. . . . . .
. . . . . 104-J, 127-J, 273-J, 466-K
Webeler, R. 334-P
Weber, Gustave A. 44-J
Weber, Herbert J. 137-E
Weber, Joachim 433-M
Weber, R. 283-T, 284-T
Weber, W. 322-S
Weck, R. 74-K
Wedl, H. 201-F, 49-T
Weeber, P. G. 681-K
Weertman, J. 449-Q
Weigert, K. M. 363-K
Weik, Helmut 169-N
Weil, George L. 114-T
Weil, Hermann 191-J
Weil, K. 138-R
Weil, L. 209-P
Weilandt, B. 95-D, 237-D
Weiler, O. 180-T
Weiman, Andrew L. 299-Q
Weinberg, Alvin M. 138-T
Weinberg, Elliot H. 558-Q
Weingaertner, Ernst 158-A
Weinhold, J. 808-Q
Weinig, S. 1030-Q
Weinman, J. 109-H
Weinstein, Marvin S. 585-K
Weir, C. R. 35-J
Weis, G. H. 77-C
Weisberg, Alfred M. 207-L
Weisert, E. D. 416-R
Weisman, W. I. 54-L
Weisner, Harold J. 401-L
Weiss, Helmut 138-F, 506-P
Weiss, K. R. 177-Q
Weiss, R. J. 35-M
Weiss, R. O. 314-R
Weiss, S. 200-J
Weissler, G. L. 224-P
Welber, B. 334-P
Welch, A. J. E. 265-M, 512-P
Welch, John C., Jr. 255-G
Weldingh, H. 38-R
Welker, H. 349-P
Wellauer, E. J. 600-Q
Weller, C. E. 181-K
Wellinger, K. . . . . .
. . . . . 110-Q, 532-Q, 945-Q, 999-Q
Wells, A. A. 456-Q
Wells, C. Kenyon 202-T
Wells, N. J. 982-Q
Wells, R. A. 281-A
Wells, R. R. 200-B
Welter, G. 53-C
Welz, St. 504-Q
Wendon, G. W. 5-H
Wendt, Otto 366-K
Wendt, William J. 191-B
Wenger, Clifton E. 135-J
Wenk, Edward, Jr. 602-Q
Wenman, W. A. 148-G
Wens, Cornelius 13-D
Wensch, Glen W. 190-J
Wentworth, R. P. 489-K
Wentz, W. W. 479-Q
Wenzel, Werner 362-D
Wepner, Wolfgang 232-N
Werner, A. W. 455-Q
Werner, Daniel R. 311-R
Werner, J. K. 83-L
Werner, M. 57-R, 68-R, 217-R
Wernick, S. 475-L, 671-L
Wert, C. 215-N, 162-P, 639-Q
Werthebach, Paul 317-K
Wessel, Günter. 164-M
West, A. C. 544-L, 847-Q
West, E. G. 87-A
West, G. W. 138-Q, 917-Q
West, Harry J. 612-L
West, John M. 85-V
Westbrook, R. D. 102-D
Westendorp, G. 685-K
Westergaard, H. M. 121-Q
Westerman, Arthur B. 24-M
Westlund, Roy A., Jr. 470-P
Weston, G. 337-D
Westover, Jeff A. 77-A
Wet, J. P. de 631-E
Wever, Franz 66-M
Weyerer, Hermann 293-P
Whiskin, L. C. 454-R, 495-R
Whitaker, Marjorie 617-E
White, A. B. 232-K
White, Albert E. 38-Q, 12-V
White, A. M. 266-J
White, G. K. 375-P, 493-P
White, J. 517-E
White, J. D. M. 128-F, 97-G
White, W. H. 45-G, 406-G
Whitehead, D. J. 565-Q
Whitehead, W. D. 323-P
Whitehouse, G. D. 150-E
Whitehouse, W. J. 86-M, 282-P

Whiteney, John R. 482-R
Whiting, A. N. 144-S
Whitlock, J. B. 357-S
Whitney, John R. 411-R
Whitney, L. H. 63-H
Whittaker, Alan 148-L
Whittaker, E. J. W. 290-M, 296-M
Whittemore, O. J., Jr. 1-B
Whitton, H. G. G. 30-C
Whyte, G. N. 358-P
Wiblin, E. R. 30-M
Wick, Charles H. 151-S
Wick, R. F. 107-P
Widener, P. L. 119-E
Wideroe, R. 114-S
Widgoff, M. 367-P
Wiederholt, W. 273-R
Wiedling, T. 211-P
Wiemer, H. 289-T
Wieringen, A. van 491-P
Wieringen, J. S. van. 272-P
Wiester, Hans-Joachim 518-L, 519-L, 327-R
Wiggin, Edwin A. 177-S
Wiggin, Thomas H. 272-S
Wijn, H. P. 330-P
Wilbanks, J. E. 196-D
Wilcock, R. 82-J, 368-Q
Wild, R. 219-B
Wilde, H. D. 682-Q
Wilde, T. J. 132-D
Wilder, Howard H. 205-Q
Wilder, Thomas W., III 251-Q
Wile, Larson E. 152-E
Wiles, D. R. 177-P
Wilke, C. R. 11-P
Wilkes, E. W. 578-Q
Wilkes, J. F. 399-R
Wilkins, E. G. 18-H
Wilkinson, D. H. 227-P
Wilkinson, M. K. 151-M
Wilkinson, R. G. 172-E
Willeumier, F. H. 192-J, 357-Q
Williams, A. E. 187-A, 46-H, 356-M, 451-Q
Williams, Clyde 16-A, 143-A, 181-B, 18-V
Williams, D. C. . . . 1-E, 287-E, 249-L
Williams, D. N. . . 392-M, 304-N, 624-Q
Williams, H. J. 389-P
Williams, I. V. 349-S
Williams, J. 646-E, 359-M
Williams, J. T. 31-K
Williams, Keri 7-Q
Williams, M. L. 706-Q
Williams, O. B. 247-R
Williams, R. C. 231-F, 339-R
Williams, W. L. 73-V
Williams, W. M. 622-Q
Williamson, G. K. 107-M, 127-M, 259-M, 307-N, 315-Q
Willig, F. J. 301-Q
Willis, B. T. M. 31-M, 262-M
Willis, G. M. 591-L
Willners, Harry 359-Q
Wilman, H. 10-N, 856-Q
Wilsdorf, Heinz . . 299-M, 239-Q, 295-Q
Wilson, A. C., Jr. 475-P, 888-Q
Wilson, A. H. 384-M
Wilson, B. A. 147-G
Wilson, Carl R. 546-L
Wilson, D. V. . . . 142-F, 228-G, 297-G
Wilson, Elizabeth D. 322-P
Wilson, G. W. 395-M, 396-M
Wilson, I. W. 234-A
Wilson, J. B. 565-Q
Wilson, J. K. 458-L, 585-L
Wilson, Lorenz H. 559-L
Wilson, R. 68-S
Wilson, S. S. 285-R
Wilson, T. N. 224-P
Wilson, W. M. 139-Q
Wilson, W. R. 472-L, 629-L
Wimmert, R. J. 282-E
Winandy, L. 241-L
Winblad, N. 49-D
Winegard, W. C. 2-E, 207-E, 111-N, 278-N
Winger, J. G. 245-E
Winkel, M. J. 157-C
Winkle, D. M. van 369-M
Winkler, C. A. . . 265-L, 672-L, 353-P
Winkler, Otto 172-C, 649-E
Winlock, Joseph 490-Q
Winnacker, Karl 158-A
Winston, A. W. 96-T
Winter, August 626-E
Winterbottom, A. B. 19-A, 70-R
Wirth, J. K. 88-R
Wise, E. N. 209-R
Wiseman, H. A. B. 894-Q
Wistreich, J. G. . . . 246-G, 283-G, 69-J
Witcomb, E. W. 19-B
Witherspoon, J. C. 146-D
Witschey, Ray A. 153-B
Witte, Helmut 53-M
Witteman, G. P. . . . 311-D, 368-G, 311-T
Witthoff, J. 89-G
Wittmoser, A. 284-F, 303-M, 79-N, 140-N, 150-N
Wittrick, W. H. 147-S
Witzig, Warren F. 15-Q
Wlodek, T. W. 6-S
Wogrinz, A. 101-L

Wohlfarth, E. P. . . 140-P, 202-P, 508-P
Wojtowicz, W. J. 108-G
Wolcott, Robert, Jr. 247-G
Wolf, E. F. 82-R
Wolf, John E. 307-E
Wolf, R. E. 36-J
Wolf, W. 250-D
Wolfe, K. J. B. 1051-Q
Wolfe, William R. 483-R
Wolfer, W. 356-E
Wolff, L. 663-K
Wolff, U. 109-S
Wolga, G. J. 475-P
Wood, Chuck 219-K
Wood, D. B. 298-T
Wood, D. S. 420-Q, 865-Q
Wood, H. B. 144-K
Wood, J. W. 18-R
Wood, Rawson L. 56-E
Wood, Richard 91-G, 110-G
Wood, R. T. 46-E
Wood, W. A. 80-Q, 258-Q
Wood, W. P. 131-E, 206-Q
Woodard, D. A. 75-B
Woodard, Dudley 29-J
Woodcock, F. J. 177-Q
Woodcock, J. 8-B, 165-B
Woodfine, B. C. 277-Q
Wooding, Walter H. 271-K, 346-K
Woods, R. T. 302-E
Woodside, Glenn E. 206-L
Woodward, A. M. 492-P
Woodward, A. R. 247-Q
Woodward, Earl R. 116-T
Woody, G. V. 66-B
Woolley, Richard P. 955-Q
Woolley, R. L. 518-Q
Wooster, W. A. 266-M
Work, C. E. 867-Q
Worley, Robert W. 247-D
Wormwell, F. 62-R, 99-R,
. . 142-R, 179-R, 224-R, 258-R, 337-R
Worner, H. W. . . . . .
. . . 26-C, 10-H, 208-J, 250-M, 108-V
Wörwag, G. 453-L
Wrazej, W. J. 84-R
Wright, D. K. 383-Q
Wright, E. A. 16-Q
Wright, E. C. 134-D, 223-D
Wright, D. A. 327-P
Wright, K. H. R. 298-P
Wright, O. 458-L, 585-L
Wright, R. E. 147-D
Wright, W. G. 61-V, 82-V
Wright, W. J. 18-J
Wrobel, S. A. 229-B
Wu, M. H. Lee. 418-Q
Wübbenhorst, H. 134-B, 211-B
Wulff, J. . . . 182-N, 84-P, 312-Q, 974-Q
Wullhorst, B. . . . 295-L, 449-L, 451-L
Wunsch, Erhard 197-A
Wurgler, Carl 480-K
Würth, W. 147-T
Wusatowski, Z. 283-F
Wyatt, James L. 226-J, 355-P
Wyatt, K. S. 194-F, 340-T
Wyatt, O. H. 574-Q
Wyckoff, L. B. 134-E
Wyler, E. 114-R
Wyman, C. H. 204-Q
Wyman, L. L. 340-M
Wyndham, J. L. P. 102-V
Wynne, R. H. 114-M
Wynne-Jones, W. F. K. 668-L
Wyon, G. 261-Q, 940-Q, 941-Q
Wyss, T. 241-Q
Wyzeenbeek, Andrew . . . 184-K, 235-K

X

Xenis, C. P. 45-T

Y

Yaeger, Carl M. 99-F
Yafet, Y. 171-P
Yaffe, L. 156-P, 173-P, 221-P
Yager, L. D. 173-D
Yakushjin, V. P. 590-K
Yamaguchi, Shigeto, ... 200-M
Yamamoto, A. 389-M
Yamanouchi, Hiroshi . . . 304-G, 838-Q
Yang, C. H. 484-Q, 485-Q
Yang, Ling 369-S
Yang, Stella 369-S
Yao, T. P. 352-E
Yao, Y. L. 213-N
Yarber, Ken 128-A
Yarborough, S. L. 2-J
Yarotsky, M. F. 136-A
Yasuda, Kazuo 331-S
Yates, E. L. 84-N
Yeager, Ernest 136-P
Yeaton, R. A. 180-S
Yerkovich, L. A. 435-K
Ying, C. F. 39-P
Yokobori, Takeo 84-Q
Yokota, Kiyoshi . . 508-E, 553-K, 248-N
Yonker, K. J. 326-P
Yost, Don M. 168-M
Young, D. 176-K
Young, E. G. 313-R
Young, Howard L. 166-A, 280-A
Young, J. G. 648-K

Young, M. K. 132-E
Young, R. A. 113-M
Yurev, S. F. 92-J

Z

Zaat, J. H. 288-S
Zabban, Walter 147-A
Zabec, V. J. 439-E
Zabriskie, Clinton F. 64-E
Zaid, Melvin. 514-Q, 609-Q
Zaikov, M. A. 109-Q
Zaletayeva, R. P. 246-D
Zalkin, Allan 256-M
Zapffe, Carl A. 105-A, 408-M, 410-R, 316-S, 42-V
Zappa, Luisa 213-P
Zarban, Walter 56-A
Zarembo, K. S. 920-Q
Zaruba, W. G. 115-J
Zastera, Anton 131-S
Zatev, A. 179-J
Zatulovskii, M. I. 785-Q
Zavaritskaia, T. A. 100-H
Zavaritskii, N. V. . . 51-P, 431-P, 435-P
Zechner, Sepp 192-S
Zeerleder, A. von 2-H, 11-H, 96-H, 57-S
Zehnder, F. J. 30-J, 51-J
Zeitz, Ed. 138-J
Zell, R. C. 153-T
Zeller, F. 176-K
Zelley, W. C. 422-L
Zemantowsky, Mary T. 104-E
Zemek, F. 129-C
Zemsch, P. 71-H, 306-P
Zeno, R. S. 376-Q
Zeppernick, Friedrich 487-P
Zettlemoyer, A. C. 110-P
Zeyen, K. L. 177-K, 628-K
Zhuravlev, B. V. 497-K
Zhuravleva, M. G. 251-D
Ziegfeld, R. L. 66-A
Ziegler, W. T. 113-M
Zielasek, G. 321-T
Zietlin, Alexander 14-F
Ziliani, G. 56-D
Zimmer, F. C. 38-K
Zimmer, Herbert 396-G
Zimmer, Karl-Otto 212-D
Zimmerli, Edwin J. 306-T
Zimmerman, J. H. 149-F
Zingeser, P. K. 287-K
Zinn, W. H. 101-T, 209-T
Zirngibl, H. 394-L, 141-R
Zizicas, G. A. 443-Q
Zlatin, Norman . . . 78-G, 130-G, 407-G
Zorev, N. N. 114-G
Zotov, T. D. 19-P
Zuithoff, A. J. 78-E
Zuker, Myron 73-K
Zuliani, G. 264-D
Zuloaga, J. L. 446-K
Zwart, K. K. 190-K, 442-K
Zwicker, Ulrich 373-M
Zwietering, Th. N. 442-P

SUBJECT INDEX

Since the annotations in the main section of this book are classified into 19 main sections based primarily upon processes and properties, the emphasis in this index has been placed on materials, products, and applications.

Entries under names of processes and properties usually refer only to general treatments of the subject. Wherever possible, items have been indexed under the name of the material or type of material (usually metals, alloys, or metal forms), or under product name. For the latter, broad designations like "Agricultural equipment" are preferred for main headings. Specific items such as "plows" usually are mentioned only in the subheadings. For example, material on rolling of aluminum alloys appears under "Aluminum alloys, rolling of"; rather than under "Rolling, of aluminum alloys".

An attempt has been made to make the heads as specific as the source material, but not more so. On the other hand, the various specific aspects of a book or treatise on a broad subject are not indexed separately. In general, subject headings have been chosen to conform with the usage in the "ASM-SLA Metallurgical Literature Classification", published by the American Society for Metals, 1950.

Alloy systems in which one member is predominant in percentage composition are indexed under that member only. For example, magnesium-base alloys containing aluminum and zinc are indexed only under "Magnesium- aluminum-zinc alloys". Alloy steels and alloy cast irons are indexed under the name of the principal alloying element. — Meredith S. Wright

Abrasion, 298-P. See also Friction; Wear.
  testing, 259-Q, 377-Q
Abrasive blasting, 167-L, 682-L
  shot, 137-L, 479-L, 574-L, 725-L
  slidabrading, 88-L
  wet blasting, 84-L, 170-L, 255-L
Abrasives, 231-G, 265-G, 418-G, 133-L, 486-L. See also Diamonds and under Tumbling
Acids, corrosive action, 133-R, 242-R, 273-R, 472-R. See also names of acids, e.g., Hydrochloric acid
Acoustic waves, 7-P. See also Supersonic waves
Adhesion, 223-P
Adhesives
  corrosion resistance, 351-K, 196-L
  glass to metal, 235-K, 592-K, 558-L, 122-V
  metal to metal, 153-K, 192-K, 226-K, 312-K, 348-K, 351-K, 391-K, 668-K, 677-K, 265-Q
  plastic to metal, 310-K, 223-P
  rubber to metal, 262-K, 309-K, 433-K
  standards, 586-K
Aerosols, 313-R
Age hardening, 198-G, 19-N, 165-N, 215-N, 232-N, 477-Q, 784-Q. See also under specific metals
Agricultural machinery. See Farm machinery
Air compressors, 140-F, 116-J, 375-K, 389-K, 397-Q, 205-R
Air conditioning equipment, 188-A, 307-A
  corrosion, 322-R
Air pollution, 6-A, 107-A, 144-A, 194-A 59-E, 245-T. See also under Foundries; Steel mills
Aircomatic welding. See Inert arc welding
Aircraft
  corrosion protection, 435-L, 6-R, 26-R
  design, 884-Q, 933-Q
  helicopters, 458-Q
  inspection, 302-S, 362-S
  skin temperatures, 465-P
  stratospheric flight, 75-T
  strength tests, 46-Q, 122-Q
  stress analysis, 280-Q, 916-Q

Aircraft (cont.)
testing, 230-T
weight-strength analyses, 46-Q
Aircraft engines, 93-K. See also Jet propulsion engines
corrosion, 36-R
fatigue, 932-Q
machining, 2-G, 245-G
Aircraft fuel tanks, 39-K, 23-T
Aircraft hangars, 52-T, 214-T, 246-T, 357-T
Aircraft landing gear, 109-J, 588-K, 203-T
Aircraft manufacture
cast parts, 7-T
finishing, 631-L
forged and extruded parts, 43-T
grinding, 20-G
materials, 985-Q, 86-T, 126-T, 178-T, 190-T, 229-T. See also under Aluminum alloys; Magnesium alloys
nondestructive testing, 75-S
presswork, 19-F, 110-F, 111-F, 112-F, 257-G
specifications, 152-S
tooling, 373-S
welding, 5-K, 61-K, 219-K, 353-K, 529-K
Aircraft propellers, 268-F, 349-T
Aircraft wings
design, 176-Q, 158-T
fatigue, 7-Q, 480-Q
forging, 19-F
Alkali metals, 55-N, 65-P, 429-P
Allotropic transformations, 233-N. See also under specific metals
effect on anelasticity, 268-N
in melting process, 195-N
in metalloids, 245-N
internal stress in, 779-Q
reaction velocity, 268-Q
relation to thickness, 318-M
thermodynamics of, 120-N
x-ray study, 263-N
Alloy steel. See Steel and specific steels, e.g., Chromium-nickel steel
Alumina. See Aluminum oxides
Aluminum
compressibility, 1026-Q
creep, 19-Q, 171-Q, 173-Q, 228-Q, 229-Q, 261-Q, 741-Q, 791-Q, 893-Q
crystallization, 229-M
determination, 111-S, 112-S, 191-S
dissolution in nitric acid, 55-R
elasticity, 647-Q, 928-Q
electrical properties, 100-P, 288-P, 81-T
electrochemical potential, 56-R, 155-R
electrochemistry of, 9-P
electron absorption, 210-P
fatigue, 381-M
Aluminum (cont.)
grain growth, 156-N, 255-N
in iron, 39-M, 56-N, 170-N
in steel, 152-B, 38-D, 23-Q, 649-Q
isotopes, 164-M, 274-P
lattice spacing, 150-M
microstructure, 38-M, 175-M
monovalent, 1-C
orientation, 58-M
penetration in refractories, 97-B, 449-E
plastic deformation, 38-M, 127-M, 419-M, 20-Q, 146-Q, 1036-Q
slip, 19-Q, 229-Q, 239-Q, 295-Q, 501-Q, 533-Q, 754-Q, 927-Q
proton capture, 184-P
"Raffinal", 63-V
reaction with hydrogen, 37-N
recrystallization, 22-N, 145-N, 169-N, 178-N
shear, 753-Q
stress, 502-Q
structure of extruded, 130-M
surface tension, 152-P
tensile strength, 345-M, 315-Q
vapor deposition, 152-N
viscosity vs. temperature, 13-P
Aluminum alloys, 54-M, 675-Q, 17-T, 30-T, 31-T, 216-T, 15-V, 66-V
age hardening, 188-N, 251-N
aging, 23-J, 110-J, 113-J, 165-J, 828-Q
analysis, 190-S, 200-S, 225-S
annealing, 197-G
anodizing, 192-G, 52-L, 311-L, 318-L, 391-L, 392-L, 532-L, 583-L, 613-L, 721-L, 722-L, 34-Q, 377-S, 140-T. See also Aluminum oxides
arc cutting, 122-G, 159-G
bending, 83-G, 886-Q
blanking and punching, 318-G
bonding, 96-K, 51-L
bonding to steel. See Aluminum coatings
brazing, 95-K, 196-K, 260-K, 390-K
clad. See Clad aluminum
cleaning, 17-L
compression strength, 498-Q, 911-Q
corrosion, 132-R, 324-R, 400-R, 433-R. See also Aluminum alloys, passivation
acid, 94-R, 215-R, 273-R, 472-R, 492-R
aqueous, 480-R
atmospheric, 42-R, 120-R, 181-R, 233-R, 154-R, 420-R, 428-R, 434-R, 445-R, 463-R, 477-R, 481-R
bacterial, 487-R
cooling agents, 435-R
effect of impurities, 154-R
ethylene perchlorate, 180-T

Aluminum alloys (cont.)
corrosion (cont.)
gases, 290-R
in chemical equipment, 367-R
intergranular, 422-R
pitting, 129-R, 249-R
sea water, 364-R
soil, 456-R
stress, 237-R
testing, 155-R
creep, 329-P, 88-Q, 173-Q, 445-Q, 922-Q, 941-Q, 977-Q
degreasing, 632-L
design data, 282-Q, 674-Q
drawing, 98-G, 194-G, 195-G, 196-G, 197-G, 263-G, 289-G, 292-G
dyeing, 583-L
electric resistance, 329-P
electroplating on, 136-L, 256-L, 472-L, 595-L, 607-L, 690-L, 714-L, 727-L
chromium, 356-L, 703-L
copper, 47-L, 323-T
nickel, 474-L, 703-L
silver, 472-L
zinc, 395-L, 422-L
enameling, 210-L, 284-L, 533-L
equilibrium diagrams, 37-M, 185-M
etching, 676-L, 63-M
extrusion, 12-F, 20-F, 44-F, 110-F, 220-F, 267-F, 270-F, 280-F
impact, 10-G, 160-G, 239-G, 413-G
textures, 319-Q, 1036-Q
fatigue, 247-Q, 434-Q, 572-Q, 618-Q, 789-Q, 873-Q, 995-Q, 1012-Q
finishing, 368-L, 432-L, 673-L
forging, 29-F, 53-F, 108-F, 110-F, 111-F, 158-F, 189-F, 198-F, 227-F, 237-F, 242-F, 277-F, 203-T
grain growth, 85-N
grinding, 291-G
hardness, 377-M, 475-Q, 946-Q
heat resistance, 28-Q, 83-Q, 793-Q
heat treatment, 106-J, 138-J, 142-J, 177-J, 57-S
impact test, 951-Q
in agricultural equipment, 275-T
in aircraft, 270-Q, 60-T
in aircraft hangars, 52-T, 214-T, 246-T
in automobiles, 172-T
in bearings. See Bearings and bearing metals
in boxes, 93-T
in brewery equipment, 144-T, 145-T, 146-T
in bridges, 331-T, 345-T
in buildings. See Buildings, aluminum
in busbars. See Busbars

Aluminum alloys (cont.)
in bicycles, 112-T
in cables. See Cables
in cans and containers, 487-R, 12-T, 144-T, 145-T, 146-T, 215-T, 306-T
in chemical equipment, 205-T, 303-T
in computers, 148-T
in conveyers, 208-T
in cranes, 160-T
in diesel engines, 18-T, 189-T
in electric equipment, 427-L, 629-L, 81-T, 118-T, 140-T, 173-T, 181-T, 263-T, 316-T. See also Busbars
in flour milling, 238-T
in furniture, 94-T
in gas turbines, 308-T
in irons, 360-T
in kitchen equipment, 309-T
in ladders, 237-T
in lighting fixtures, 204-T
in materials handling equipment, 113-T, 155-T
in mine props, 131-T, 142-T
in motor buses, 188-T
in nails, 80-T
in packaging. See Aluminum foil
in petroleum industry, 266-T
in pistons, 173-K, 16-N
in presses, 43-G
in pressure vessels, 43-Q, 102-T
in railroad cars, 63-T, 242-T, 254-T, 258-T
in refrigerators, 327-T
in ships, 60-T, 141-T, 317-T
in street cars, 147-T
in transportation equipment, 268-T
machinability, 262-G
machining, 158-G, 161-G, 236-G, 247-G, 252-G, 390-G
milling, 154-G, 242-G
nuclear uses, 236-T
oxide coatings, 248-L, 342-M
painting, 192-G, 139-L, 161-L, 212-L, 467-L, 494-L, 573-L
passivation, 272-R, 362-R
plastic deformation, 100-Q, 246-Q, 256-Q, 319-Q, 349-Q, 625-Q, 918-Q, 925-Q, 940-Q, 941-Q
plasticity, 894-Q
polishing, 291-G, 146-L, 313-L, 475-L, 517-L, 347-L, 649-L
pressing, 110-F, 257-G, 326-T
properties, 489-P
protective coating, 111-L, 269-L, 435-L, 546-L, 363-R
quench hardening, 15-J, 111-J, 131-J
reflectivity, 376-S, 324-T
riveting, 625-K, 631-K, 635-K, 701-K, 945-Q

Aluminum alloys (cont.)
roll forming, 70-G
rolling, 118-F, 143-F, 220-F, 270-F, 349-Q
rubber pad forming, 187-G
segregation, 63-M
soldering, 95-K, 196-K, 378-K, 597-K
ultrasonic drive, 135-K, 136-K, 16-L, 469-L
specifications, 18-S, 145-S, 349-S
stretch forming, 276-F, 5-G, 38-G, 261-G, 320-G, 380-G
structure of extruded, 130-M
tensile testing, 242-Q, 212-R
tension properties, 255-Q, 419-Q, 665-Q, 668-Q, 880-Q, 977-Q
thermoelectric force, 64-M
uranium-oxide-coated, 546-L
welding, 27-K, 196-K, 416-K, 545-K, 575-K, 601-K, 679-K, 434-Q
welding, arc, 155-K, 171-K, 258-K, 269-K, 537-K, 569-K, 648-K, 667-K
welding, flash, 671-K
welding, fluxless, 41-K
welding, forge, 91-K, 360-K
welding, inert arc, 7-K, 173-K, 207-K, 265-K, 271-K, 319-K, 330-K, 409-K, 450-K, 538-K
welding, oxyacetylene, 702-K
welding, resistance, 39-K, 112-K, 307-K, 392-K
welding, spot, 5-K, 77-K, 497-K, 613-K, 23-T
welding, thermit, 315-K, 626-K
welding, wedge, 99-K
welds
tracking, 125-K
explosion bulge test, 58-Q
vacuum tightness, 165-K
working, 179-F, 295-G
wrought, 622-Q, 117-V
Aluminum - antimony alloys
semiconductivity, 349-P, 185-T, 299-T, 321-T
Aluminum borides, 431-M
Aluminum-boron alloys, 190-S
Aluminum bronze, 13-V
allotropic transformations, 102-M
coating on steel, 505-L
corrosion, 491-R, 72-T
dies, 301-T
eutectoid reactions, 298-N
Aluminum bronze foundry practice, 3-E, 11-E, 34-E, 274-E
Aluminum castings, 73-E, 216-E, 516-E, 170-T, 269-T, 107-V. See also Aluminum foundry practice
Aluminum castings (cont.)
chromium-plated, 329-E
defects, 234-E
finishing, 7-L
gas analysis, 146-S
impregnation, 562-E
inspection, 196-S
mechanical properties, 240-E, 7-T
porosity, 15-E
shrinkage, 163-E
specifications, 237-E, 313-E, 234-S
welding, 28-K
welding repair, 48-K
x-ray inspection, 303-S
Aluminum-chromium-nickel alloys, 186-M
Aluminum-chromium-titanium alloys, 275-N
Aluminum coatings, 50-L, 645-L
annealing, 180-J
on steel, 411-K, 12-L, 79-L, 237-L, 482-L, 560-L, 708-L, 829-Q, 295-T
spraying, 14-L, 539-L, 277-R
Aluminum-copper alloys, 46-T, 133-T
age hardening, 157-M
electric conductivity, 447-P
nucleation, 201-N
recrystallization, 297-N
slip, 199-Q
specifications, 105-V
structure, 302-M
tension properties, 354-Q, 978-Q
thermodynamic study, 93-P
vacuum evaporation, 94-M, 301-M, 322-M, 367-M, 228-N
welding, 316-N
Aluminum-copper-magnesium alloys, 228-S, 23-V
phase diagrams, 185-M
Aluminum-copper-silicon alloys, 343-M, 826-Q
phase diagrams, 185-M
Aluminum die casting practice, 74-E, 174-E, 332-E, 365-E, 388-E, 398-E, 620-E
Aluminum die castings, 342-E, 407-E, 337-T, 116-V
chromium plating, 356-L
finishing, 441-L
in electric switches, 332-E, 404-E
in gas meters, 276-T
in wire insulation, 344-E
mechanical properties, 126-Q
Aluminum extraction and refining, 21-C, 87-C, 113-C, 136-C, 162-C, 39-V
electrolytic processes, 5-C, 57-C, 71-C, 107-C, 119-C, 120-C, 125-C, 135-C, 66-T

Aluminum extraction and refining (cont.)
fluxes, 174-B
fume disposal, 6-A
halide decomposition, 161-C
ingot casting, 70-C, 96-C, 110-C
patent review, 108-C
refractories, 97-B, 449-E
smelting, 9-C, 96-C, 97-C, 111-C
Aluminum foil
gas adsorption, 307-P
heat protection, 322-T
insulation, 282-T
manufacture, 232-F
packaging material, 6-R, 234-T, 262-T
surface studies, 220-S
Aluminum foundries, 553-E, 635-E
Aluminum foundry practice, 24-E, 182-E, 192-E, 306-E, 439-E
degassing, 263-E
gating, 168-E
grain refinement, 264-E, 440-E
melting, 144-C, 186-E, 449-E, 550-E, 644-E
metallurgical control, 12-E, 29-E, 186-E
molds, 171-T
permanent mold, 18-E, 73-E, 617-E
plaster casting, 341-E, 593-E
plaster cores, 65-E
precision investment casting, 100-E
sand casting, 18-E, 73-E, 211-E, 374-E, 577-E
shell molding, 387-E, 425-E
Aluminum industry, 132-A, 330-T
Canada, 241-A
England, 202-A
Europe, 14-G
France, 254-A
Japan, 4-A
nomenclature, 113-A
production and demand, 81-A, 85-A, 87-A, 132-A, 175-A, 213-A, 228-A, 234-A
Aluminum-iron alloys, 237-M
Aluminum-iron-nickel alloys, 208-P
Aluminum-iron-silicon alloys, 117-M
Aluminum-iron-zinc alloys, 230-M
Aluminum-lead-tin alloys, 156-M
Aluminum-magnesium alloys, 241-E
creep, 909-Q
phase diagrams, 231-M
plastic deformation, 803-Q
tension properties, 667-Q
Aluminum-magnesium-silicon alloys, 43-Q 120-R, 115-V
Aluminum-magnesium-zinc alloys, 314-K, 64-R
Aluminum-manganese alloys, 257-M
Aluminum-nickel alloys, 143-M
Aluminum-nickel powders
sintering, 31-H
Aluminum nitride, 287-N, 288-N
Aluminum ores
Jamaican, 128-B
Aluminum oxide
atomic structure, 289-M
electric properties, 100-P, 238-P, 257-P, 415-P
properties, 214-P
sintered, 113-G
Aluminum paint, 131-A, 5-H, 23-L, 25-L, 150-T
Aluminum plating, 577-L, 666-L
Aluminum powders and compacts, 5-H, 11-H, 115-H, 125-H
creep, 77-Q
hardness, 22-H
magnetic properties, 405-P
mechanical properties, 7-H
production methods, 96-H, 108-H
specific surface, 100-H
Aluminum scrap
refining, 68-A, 253-A
Aluminum sheet, 149-T
bending, 11-G, 3-Q
bi-metal, 46-T, 133-T
compression strength, 606-K, 158-T
corrugated, 3-Q, 282-T
drawing, 22-G
earing, 460-Q
fatigue, 34-Q
forming, 120-F, 239-G, 381-G
honeycomb structure, 89-K, 71-T
reflectivity, 376-S, 324-T
shear stress, 279-Q
strength of perforated, 863-Q
strength of riveted, 606-K
stresses in, 388-Q
welding, 565-K
Aluminum-silicon alloys
porosity of cast, 64-E
structure of modified, 94-E, 174-M, 249-M, 398-M, 417-M, 16-N
welding, 316-N
Aluminum-silicon-zinc alloys, 837-Q
Aluminum-silver alloys, 31-V
age hardening, 96-N, 179-N, 312-N
superlattice formation, 364-M
Aluminum-tin alloys, 681-Q
Aluminum, structural. See Buildings, aluminum
Aluminum-zinc alloys, 580-E, 135-M, 111-Q, 126-Q
Aluminum-zirconium alloys, 386-M
Amalgams, 31-C, 109-C, 413-M. See also specific metal amalgams

American electroplaters' society
1952 proceedings, 491-L
research program, 411-L
American iron and steel institute, 272-A
proceedings, 39-A, 242-A
American society for metals
metal literature classification, 82-A, 83-A
1952 transactions, 114-A
world congress, 36-A
American society for testing materials
annual report, 301-A
Ammunition. See Shells (ordnance)
Amplifiers, 131-P, 379-P, 204-S, 51-T
Analysis, 181-S, 251-S. See also specific methods of analysis and under names of materials and products
Anelasticity, 429-M, 566-Q
atomic mobility measurement, 10-Q, 316-Q
effect of transformations on, 268-N
measurement of, 181-Q
metallurgical uses, 639-Q
relation to creep, 284-Q
temperature dependence, 317-Q
theory of, 576-Q
Annealing, 39-J, 89-J, 124-J, 581-L
austenite decomposition, 52-J, 209-N
controlled atmosphere, 12-J
malleabilizing, 235-J
recrystallization, 112-N
salt bath, 60-J
spheroidizing, 196-J
stability of oxide film, 112-J
stabilization, 52-J
Annealing furnaces, 87-F, 90-J, 172-J, 175-J
bell-type, 97-J
electric, 91-J, 187-J
gas-fired, 2-J, 45-J, 170-J
instrumentation, 120-J
jet burners, 197-J
linings, 246-J
pan-type, 100-J
Anodizing, 39-L, 192-L, 247-L, 391-L, 524-L, 592-L. See also under specific metals.
coating tests, 341-S
coating thickness, 378-S
sulfuric acid bath, 194-L, 397-L
Anti-freezes
corrosion inhibitors, 179-R
corrosive action, 341-R, 435-R
Antimony
anodic polarization, 111-P
diffusion in silver, 25-N
Antimony (cont.)
in steel, 365-Q
oxidation, 134-C
specific heat, 509-P
structure, 205-M, 371-M
Antimony alloys
printing metal, 294-T
structure, 428-M
Antimony-aluminum alloys
semiconductivity, 349-P, 185-T, 299-T, 321-T
Antimony-chromium alloys, 194-P
Antimony extraction and refining,
distillation, 126-C
smelting, 40-C, 92-C
Antimony-indium alloys. See Indium-antimony alloys
Antimony industry, 178-A, 211-A
Antimony-lead alloys, 169-M
age hardening, 41-N, 117-N
Antimony ores, 74-B, 132-B
Antimony oxides, 292-M
Antimony-tellurium alloys
electric properties, 57-P
Arc welding, 155-K, 191-K, 308-K, 628-K, 650-K, 666-K. See also Inert arc welding; Submerged arc welding; and under specific materials and products, e.g., Steel, welding, arc
alternating current, 67-K, 190-K, 356-K, 442-K
arc extinction, 190-K, 442-K
arc studies, 261-K, 533-K
automatic, 30-K, 139-K, 499-K, 519-K, 604-K
books, 57-K, 202-K, 293-K, 544-K, 546-K
cables, 154-K, 502-K
contact arc, 176-K
"cyc-arc", 127-K
electro-rivets, 498-K
electrodes. See Electrodes, welding
fixtures, 78-K, 108-K, 152-K, 236-K, 465-K
fluxes, 504-K
fumes, 62-K
"K-welding", 548-K
load voltage, 659-K
multi-arc, 87-K, 347-K, 494-K
parallel ignition, 318-K
penetration-melting ratio, 270-K
protecting workpiece, 486-K
safe practice, 559-K
self-adjusting arc, 699-K
skipwelding, 556-K
stresses in, 174-K

Arc welds
annealing, 222-J
gas content, 244-K
stress relief, 128-K
testing, 380-S
Archaeology, 123-A
Argon arc welding. See Inert arc welding
Armor plate
cleaning, 503-L
flame cutting, 43-J
heat treatment, 164-J
quench hardening, 77-J
Arsenic
in steel, 129-M, 365-Q, 531-Q, 615-Q
structure, 205-M
Arsenic-indium compounds, 98-M
Asphalt coatings, 1-L, 309-R
Austenite, 124-G, 77-N. See also Bainite; Ferrite; Martensite; Pearlite; and under Steel
carbon diffusion in 49-N, 87-N
diffusion in, 205-N
grain size, 116-M, 86-N
heterogeneity, 273-N
relation to hardness, 367-Q
retained, 124-G, 52-J, 9-M, 59-N, 97-N, 98-N, 125-N, 191-N
stabilization, 52-J, 32-N, 35-N, 91-N, 224-N, 242-N
TTT curves, 271-N
Australia
heat treating practice, 54-J
nodular iron industry, 487-E
steel industry, 79-D
titanium industry, 53-B
Automation, 58-A, 387-S. See also under specific plants and processes
Automobile bodies
aluminum, 172-T
corrosion, 312-R, 323-R
die cast parts, 344-T
finishing, 372-L, 499-L, 576-L, 710-L, 171-S
magnesium, 15-T, 59-T, 76-T
painting, 439-L, 599-L, 606-L, 312-R
pressing, 26-G, 191-G
welding, 122-K, 401-K, 555-K, 682-K
Automobile engines
clutches, 120-T, 260-T
inspection, 151-S, 168-S
radiators, 311-K, 377-K
repair, 59-G
Automobile industry
metal consumption, 198-T, 223-T
Axles
heat treatment, 32-J
Axles (cont.)
housings, welded, 428-K
manufacture, 2-A
testing, 371-S
Babbitt metal, 28-L, 648-Q, 5-V
Bainite, 5-N, 80-N, 107-N, 277-N, 103-Q
Ball milling, 120-B
Barium isotopes, 255-M, 295-M
Barium-cadmium alloys, 295-M
Barrel plating, 163-L, 208-L, 209-L, 407-L. See also Tumbling
Bars. See also Steel bars
bending, 422-Q, 564-Q, 577-Q
Bauschinger effect, 398-Q, 518-Q, 745-Q
Beams
bending, 1-Q, 248-Q, 254-Q, 416-Q, 739-Q, 745-Q, 857-Q
electrical model, 430-Q
impulse loading, 590-Q
with shear, 557-Q, 697-Q, 716-Q
compression, 560-Q, 722-Q
creep, 416-Q
damping, vibration, 256-Q, 515-Q, 544-Q, 686-Q, 687-Q
elastic behavior, 485-Q, 550-Q, 715-Q
fatigue tests, 143-Q
impact strength, 692-Q
plastic deformation, 398-Q, 635-Q
rolling, 91-F
shear, 253-Q, 568-Q, 716-Q
strength, 790-Q
stresses, 843-Q
tension, 739-Q
torsion, 557-Q, 702-Q
welding, 105-K, 107-K, 384-K
Bearings and bearing metals, 1005-Q, 1045-Q, 22-T, 134-T, 328-T
aluminum, 255-Q, 815-Q, 298-T
aluminum-magnesium alloy, 285-T
aluminum-on-steel, 295-T
aluminum-tin, 681-Q
babbitt, 648-Q, 5-V
bimetallic, 29-H, 197-T
brass, 494-Q
bronze, 60-C, 546-E, 643-Q, 117-S
cadmium alloy, 284-T
cast iron, 290-T
copper, 288-T
fatigue, 1009-Q
friction, 948-Q
heat treatment, 143-J, 158-J
iron powder, 42-H
lead alloy, 283-T, 291-T
metal powder, 29-H, 48-H, 67-H, 83-H 289-H
oil-film, 14-T
self-lubricating, 67-H, 83-H

Bearings and bearing metals (cont.)
silver alloy, 286-T
steel, 40-D, 108-T, 295-T
substitute materials, 220-T
testing, 337-Q, 1015-Q, 1016-Q
tin alloy, 681-Q, 46-V
tungsten carbide, 343-T
wear, 452-Q, 923-Q
zinc alloy, 287-T
Belgian Congo
cobalt industry, 24-B
Belgium
corrosion research, 79-A
steel specifications, 213-S
Bending, 296-Q, 742-Q, 809-Q. See also under Bars; Beams; Columns; Cylinders; Plates; Tubes; and specific metals and products, e.g., Aluminum alloys, bending
bending moments, 216-Q
failure in, 496-Q
stress distribution, 425-Q
tension in, 1044-Q
tests, 164-Q, 529-Q, 806-Q, 841-Q
Bending (metal work), 204-G, 232-G, 302-G, 419-G
Beryllium
band structure, 226-M
electric conductivity, 340-P
electrolytic polishing, 34-M
fission, 335-P
isotopes, 174-P, 322-P
neutron cross section, 174-P, 371-P
nuclear photo-effect, 338-P
properties, 280-P
resonance, 244-P
thermal conductivity, 340-P
toxicity, 37-G
specific heat, 339-P
wave functions, 240-P
Beryllium alloys
electroplating on, 339-L, 677-L
machining, 37-G
working, 42-F
Beryllium-copper alloys, 47-V, 120-V
corrosion, 402-R
die inserts, 362-E, 35-T
properties, 92-V
welding, spot, 194-K
Beryllium industry, 184-A
Beryllium ores, 104-V
Beryllium-uranium alloys, 122-M
Bessemer converter practice, 76-D, 290-D, 339-D
acid, 333-D, 340-D
dephosphorization, 14-D, 55-D, 77-D, 206-D, 326-D, 335-D
Bessemer converter practice (cont.)
desiliconization, 275-D
double-slagging, 274-D
effect of blowing area, 370-D
movement of melt, 373-D, 383-D
nitrogen control, 206-D, 276-D, 278-D, 335-D, 382-D
oxygen-enriched blast, 66-D, 97-D, 109-D, 111-D, 125-D, 286-D, 380-D
plant construction, 358-D
supersonic agitation, 359-D
two-converter process, 78-D
Bessemer converters
linings, 23-D, 211-D, 262-D, 299-D, 375-D, 376-D
low-shaft, 374-D
Bessemer slag
high manganese, 6-B
phosphorus distribution, 14-D, 55-D
Bessemer steel, 307-D, 371-D, 374-D
high-oxygen, 259-D
mechanical properties, 78-D, 29-Q, 183-D 764-Q, 947-Q
refining in open hearth, 15-D
working, 527-Q
Betatrons, 114-S, 247-S, 365-S
Bicycles, aluminum, 112-T
Bismuth
fission, 319-P
Hall effect, 29-P
optical properties, 317-P
structure, 205-M
superconductivity, 435-P
Bismuth alloys, 218-M, 454-P
equilibrium diagrams, 37-P, 38-P
surface tension, 434-P
Bismuth-antimony alloys
segregation, 408-M
Bismuth extraction and refining, 36-C, 64-C
Bituminous coatings, 118-L
Blanking and punching, 250-G, 253-G, 281-G
dies, 137-G, 121-T
dimpling, 323-G
distortion, 310-G
effect of hardness, 141-G
Blast furnace gas, 69-D
cleaning, 124-D, 205-D, 216-D, 248-D, 347-D
fuel, use as, 168-D, 247-D
iron recovery from, 131-D, 293-D, 378-D
Blast furnace practice, 82-B, 104-D, 180-D, 214-D, 228-D, 315-D, 361-D, 364-D, 366-D
agglomerated burden, 194-B, 210-B, 363-D
banking, 179-D
blast conditioning, 183-D
blast pressure, 99-D

Blast furnace practice (cont.)
blowing-in, 221-D
burden, calculating, 356-D, 360-D
burden distribution, 250-D, 381-D
burden permeability, 194-B, 258-D, 296-D
CO-CO_2 blast, 48-D
charcoal, 313-D, 314-D
charging systems, 84-D, 282-D, 381-D
coke for, 78-B, 90-B, 190-B, 50-D, 188-D, 191-D, 377-D
coke consumption, 13-D, 377-D
combustion zone reactions, 192-D
desulfurization, 95-D
differential pressure control, 182-D
elevated top pressure, 58-D, 90-D, 93-D, 181-D
furnace load, 348-D
gas flow, 250-D
gas-sampling, 110-S
heat balances, 22-D, 94-D, 270-D
installation costs, 110-D
magnetic oxide ores, 251-D
manganese recovery, 12-D, 186-D
nitrogen control, 278-D
ore disintegration, 135-D
oxygen-enriched blast, 29-D, 82-D, 88-D 203-D, 362-D, 372-D
scaffolding, 129-D
sodium carbonate additions, 235-D
statistical analysis, 184-D
Blast furnace slag, 57-D, 198-D, 210-D
in cement and concrete, 226-D, 279-D, 287-D
melilite, 232-D
manganese distribution, 187-D
metal reactions, 193-D
silicon distribution, 74-D
Blast furnaces, 19-D, 79-D, 108-D, 120-D, 190-D, 200-D, 224-D
blowers, 41-D, 42-D
conveyor charging, 257-D
cooling system, 202-D
cooling system failures, 81-D
instrumentation and control, 98-D
inwall temperature, 3-S
linings, 189-D, 219-D, 237-D, 256-D
carbon, 194-B, 47-D, 102-D, 132-D, 233-D, 288-D
low-shaft, 54-D, 61-D, 203-D, 209-D, 223-D, 344-D, 372-D
repair, 269-D
skip bridge, 201-D
tuyere raceways, 244-D
Boats. See Ships
Boilers, 130-Q
air preheaters, 289-R, 304-R, 488-R
Boilers (cont.)
cleaning, 600-L, 39-R
corrosion, 79-R, 80-R, 123-R, 387-R, 485-R
caustic cracking, 118-R, 127-R, 189-R, 284-R
condensate return, 355-R
flue gas attack, 174-R
dew point effect, 436-R
feed water treatment, 77-R, 220-R, 280-R,
materials testing, 243-S
tube maintenance, 51-K
welding, 80-K, 81-K, 218-K, 396-K
Boliva
tungsten deposits, 62-B
Bolts and nuts, 279-G, 204-J
corrosion resistance, 72-T
fatigue, 11-Q, 309-Q
heading, 103-G
impact strength, 591-Q
induction heating, 14-J
strength, 425-K
vibration resistance, 129-Q
welding, 127-K, 172-K
Boric acid, 257-L
Borides, 26-H, 27-H, 107-H, 120-M, 239-N, 32-Q
Boring and broaching, 372-G, 219-S
Boron, 239-N
determination, 190-S
in iron, 387-M
nucleating agent, 252-E, 201-N
resonant energy, 184-P, 244-P
Boron carbide, 64-H
Boron steel, 25-V, 94-V, 111-V
analysis, 108-S
carbonitriding, 228-J
embrittlement, 966-Q
hardenability, 80-J, 213-J, 228-J, 104-N, 280-N, 294-Q, 353-T
induction hardening, 7-J
machinability, 407-G
manufacture, 157-D
microstructure, 115-M
overheating, 250-F
oxidation resistance, 416-R
properties, 80-J, 30-Q, 212-Q, 303-Q, 368-Q, 385-Q, 903-Q
specifications, 154-S
working, 213-G
Brakes, 309-E, 358-T
stresses in, 202-Q
wear, 813-Q
Brass, 13-F, 80-G, 44-S, 101-S, 57-V. See also Manganese brass.
analysis, 2-M, 203-S
blistering, 317-R

Brass (cont.)
corrosion, 62-R, 489-R
diffusion, 2-N, 7-N
drawing, 98-G
electric resistance, 456-P
extrusion, 236-F
fatigue, 975-Q
friction, 494-Q
machinability, 389-G, 393-G
plastic deformation, 504-Q, 669-Q
pressing, 57-G
quench hardening, 205-J
structure, 35-M, 1014-Q
torsion, 99-Q
welding, 306-K
working, 300-G, 35-M
yield point, 986-Q
Brass die castings, 200-E, 527-E, 559-E, 291-R
Brass foundry practice, 48-C, 23-E, 201-E, 218-E
melting, 417-E
plaster casting, 397-E
sand casting, 224-E
Brass plating, 315-A, 287-L, 408-L, 455-L
Brass powders, sintered, 53-H
Brazil
coal industry, 208-B
columbium deposits, 162-B
iron ore deposits, 161-B
metal industry, 199-A, 257-A
steel industry, 336-D
tantalum deposits, 162-B
Brazing, 26-K, 46-K, 240-K, 241-K, 248-K, 266-K, 287-K, 470-K, 706-K
See also Silver brazing and under names of metals and products
carbide tips, 244-G, 471-K, 598-K
fluxes, 2-K, 300-K
furnace, 459-K, 466-K
induction, 3-K, 66-K, 568-K
inspection, 317-S
paste alloys, 231-K
preforms, 641-K
specifications, 536-K
surface alloying, 72-K
vapor flux, 332-K
Bridges, 490-K, 20-T, 241-T
aluminum, 163-T, 331-T, 345-T
metal spraying, 342-L
stresses, 147-Q, 834-Q
welded, 60-K, 82-K, 156-K, 421-K, 491-K, 540-K, 552-K
welding repair, 178-K, 374-K
British Non-Ferrous Metals Research Association
research program, 129-A, 223-A, 134-K
Broaching. See Boring and broaching
Bromides, 283-P
Bromine, 324-P
Bronze. See also Aluminum bronze; Brass; Lead Bronze; Manganese bronze; Phosphor bronze; Tin bronze
analysis, 203-S
segregation, 207-E
specifications, 101-S
wear, 67-Q, 482-Q, 643-Q
welding, 332-K
Bronze castings
porosity, 177-E, 301-E
Bronze foundry practice, 45-E, 218-E, 224-E, 231-E, 278-E, 355-E
centrifugal casting, 546-E, 568-E, 614-E, 643-Q
continuous casting, 60-C
pouring, 588-E, 613-E
sand casting, 92-E
Bronze powders, 32-H, 68-H
Brushes (cleaning), 189-L
Buildings, 385-K, 165-T, 166-T, 170-T, 319-T. See also Steel, Structural; Beams; Columns
metal lath, 117-T
prefabricated, 42-T
steel partitions, 7-G, 190-G
stresses, 808-Q
welded frame, 16-K, 32-K, 34-K, 35-K, 227-K, 263-K, 321-K, 370-K, 421-K
Buildings, aluminum, 538-Q, 60-T, 128-T, 159-T, 244-T, 270-T, 365-T
aircraft hangars, 52-T, 214-T, 246-T
ceiling panels, 342-T
design, 902-Q, 149-T, 250-T, 273-T
domes, 277-T
roofing, 565-K, 233-R, 290-R, 162-T, 191-T, 243-T, 278-T, 350-T
Busbars, aluminum, 256-L, 36-T, 45-T, 53-T, 225-T, 320-T
Busbars, copper, 36-T
Cables, 143-T
aluminum sheathing, 194-F, 9-G, 32-G, 167-G, 315-K, 28-T, 34-T, 216-T, 231-T, 340-T
lead sheathing, 288-K, 465-L, 387-Q, 623-Q
properties, 110-T
protective coatings, 336-L
vinyl cores, 168-T
Cables, underground, 177-R, 329-R
cathodic protection, 41-R, 311-R, 415-R
Cadmium
corrosion, 104-P, 114-R
dendritic growth, 36-M
determination, 182-S
heat capacity, 20-P

Cadmium (cont.)
passivation, 115-R
potential-pH diagrams, 104-P, 114-R
single crystal growth, 14-N, 31-N, 144-N
Cadmium alloys, 284-T
Cadmium-barium alloys, 295-M
Cadmium extraction and refining, 41-C, 139-C
Cadmium iodide, 31-N
Cadmium-magnesium alloys, 354-P
Cadmium plating, 201-L, 225-L, 268-L, 551-L
anodes, 263-P
fluoborate bath, 278-L
iron powder parts, 680-L
mercury cathodes, 169-L
Cadmium-silver alloys, 116-N
Cadmium sulfide
crystal growth, 144-N
photoluminescence, 445-P
Calcium
adsorption on pyrite, 99-P
Hall coefficient, 144-P
neutron activation, 372-P
nodulizer for cast iron, 178-E, 193-E, 511-E, 181-N
Calcium carbide
cupola addition, 506-E, 535-E
Calcium extraction and refining, 17-C, 175-C
Calcium-lead alloys, 175-C
Calcium ores
concentration, 125-B
Calculators, 148-T
Cameras, 406-E
Cams, 51-H, 396-S
Canada
aluminum industry, 241-A
steel industry, 95-A, 127-A
uranium industry, 192-A
Cans. See also Containers.
aluminum, 487-R, 12-T, 144-T, 145-T, 146-T, 215-T, 306-T
liners, 364-L
welding, 691-K
Carbide tools, 89-G, 131-G, 185-G, 72-H, 428-Q. See also under specific processes, e.g., Milling and hobbing, carbide cutters
brazing, 244-G, 471-K, 598-K
grinding, 86-G, 92-G, 214-G, 245-G, 330-G
manufacture, 17-H, 70-H, 112-H
specifications, 153-S
wear, 255-G, 231-Q, 912-Q
Carbides, 39-H, 118-H, 34-V. See also specific carbides, and under Steel, transformation
Carbides (cont.)
chemical bonding, 430-P
color metallography, 409-M
directory of, 25-A
formation, 162-N
in chromium steel, 159-M, 402-M
in molybdenum steel, 159-M, 401-M
in stainless steel, 85-M
in steel, 88-J, 209-N, 318-N
in toolsteel, 68-M
in tungsten steel, 159-M
microscopy of, 405-M
phase relations, 152-M
solubilities, 236-N
Carbon, 1024-Q. See also Carbides; and under specific metals, metallurgical processes, transformations and transformation products.
band structure, 226-M
determination, 176-S
resonant energy, 184-P
Carbon, activated, 451-L
Carbon, baked and graphitized, 228-B, 10-E, 486-K, 251-T. See also "linings" as subdivision under specific furnace types.
heat treatment, 145-J
Carbon black, 76-H
Carbon dioxide
corrosive action, 379-R
Carbonitriding, 129-G, 56-J, 115-J, 135-J, 149-J, 163-J, 132-P
Carburizing, 18-J, 25-J, 72-J
cementite formation, 270-J
dimensional changes in, 92-J
gas carburizing, 8-J, 24-J, 83-J, 99-J, 163-J
pack carburizing, 174-J, 199-J, 214-J
retained austenite, 97-N, 98-N
stresses in, 269-J
Cartridge cases, 56-G
Case hardening, 76-J, 144-J, 209-J, 221-J, 239-J, 169-S. See also specific processes, e.g., Carbonitriding
Cast iron, 111-B, 131-Q, 47-T, 118-V. See also Malleable iron
analysis, 124-S, 176-S, 331-S
annealing, 187-J, 259-J
blow holes, 225-E
chill testing, 290-E, 606-E
cleaning, 310-E, 27-L, 181-L
copper in, 814-Q
corrosion, 178-R
defects, 131-E, 225-E, 509-E, 624-E, 206-Q
diffusion coating, 528-L
elasticity, 939-Q
electric resistance, 378-P

Cast iron (cont.)
enameling, 175-E, 591-E
flame hardening, 154-J
gas content. See Gases in metals.
grain growth, 254-N, 293-N, 498-P
graphitization, 70-N, 247-N. See also Cast iron, nodular
hardness, 1046-Q
heat treatment, 16-J, 67-J, 93-J
hot tearing, 206-Q
hydrogen in. See Hydrogen.
in petroleum refining equipment, 351-T
lacquering, 103-L
machinability, 94-G, 135-G, 322-G
machining, 176-G, 186-G, 240-G, 415-G
nitrogen in, 200-N
pipes. See Pipes, cast iron
residual stress in, 542-J, 266-Q
rolling, 267-D, 284-F
specifications, 906-Q, 264-S, 375-S
strength, 86-Q, 238-Q
stress relief heat treatment, 542-J
surface roughness, 176-G
tapping (machining), 240-G
tensile strength, 1049-Q
thermal stability, 146-R
wear resistance, 489-E, 307-Q, 757-Q, 813-Q, 952-Q, 119-V
welding, 52-K, 285-K, 418-K, 553-K
welding repair, 31-K, 38-K, 65-K, 240-K, 354-K, 525-K, 703-K
Cast iron foundries, 37-E, 77-E, 92-E, 184-E, 221-E, 490-E
Cast iron foundry practice, 215-E, 381-E, 422-E, 427-E, 488-E, 607-E, 639-E
carbon pickup, 424-E
centrifugal casting, 36-E, 485-E
continuous casting, 43-D
dephosphorization, 131-E
desulfurization, 64-D, 77-D, 139-E, 178-E, 371-E
fettling, 68-E
fluidity test, 139-E, 143-E, 441-E
history, 202-E
melting, 245-E, 424-E, 433-E, 482-E, 492-E, 507-E, 509-E
mold reactions, 512-E
molds, 166-E, 194-E, 232-E, 605-E
patterns, 498-E, 605-E
permanent mold, 389-E
pouring, 139-E, 507-E
precision casting, 340-E
review, 107-E, 183-E
rigging, 120-E, 626-E
sand technology, 67-E
shell molding, 28-E, 173-E, 396-E
solidification, 70-E, 288-E, 298-E, 308-E, 624-E, 82-S
Cast iron foundry practice (cont.)
zirconium in, 179-E
Cast iron, nodular, 152-A, 210-E, 170-E, 480-E, 487-E, 604-E, 303-M, 231-N
calcium treat, 178-E, 193-E, 511-E, 181-N
cooling curves, 150-N, 206-N
copper in, 160-Q
fatigue, 979-Q
graphite crystal distortion, 51-M
graphite structure, 48-M
heat treatment, 16-J, 184-J
Hungarian research, 484-E, 575-E, 627-E
induction hardening, 122-J
magnesium treat, 118-A, 116-E, 121-E, 145-E, 258-E, 209-Q, 233-Q
mechanical properties, 40-Q, 47-Q, 209-Q, 211-Q, 362-Q, 472-Q, 802-Q
melting, electric, 303-D.
residual elements in, 233-Q
silicon treat, 145-E, 150-N, 205-Q, 209-Q
specifications, 237-S
stripping time, 640-E
theory of formation, 54-E, 190-E, 367-E, 633-E, 640-E, 79-N, 99-N, 140-N, 182-N, 246-N
thermal conductivity, 409-P
uses, reviews, 62-T, 77-T, 89-T, 338-T, 72-V, 84-V
wear, 185-Q
welding, 14-K, 579-K, 654-K
Cast steel, 217-E, 316-E, 189-Q, 297-T
defects, 171-E
hot tearing, 416-E, 204-Q, 210-Q, 476-Q
design, 428-E
dimensional tolerances, 522-E
heat treatment, 260-J, 292-N, 67-T
machinability, 78-G
mechanical properties, 193-Q, 983-Q
milling, 207-G
precision cast, 221-Q
wear resistance, 268-E
welding, 111-K, 693-K
Cast steel die casting practice, 590-E, 616-E, 638-E
Cast steel foundry practice, 115-E, 248-E, 262-E, 269-E, 276-E, 553-E
centrifugal casting, 93-F
continuous casting, 96-D
flow of steel, 348-E
molds, 416-E
pouring, 585-E
precision casting, 326-E, 345-E, 221-Q
reheat phenomena, 19-E
rigging, 359-E

Cast steel foundry practice (cont.)
sand burn-on, 109-E
shakeout and trimming, 214-E
shell molding, 61-E
Castings
cleaning, 227-E, 203-G, 167-L, 413-L, 730-L
costs of, 77-A, 360-E
defects, 250-E, 255-E, 486-E, 512-E, 526-E, 651-E
design, 66-E, 98-E, 150-E, 161-E, 75-Q
fracture, 112-Q
grain refinement, 23-N
grinding, 58-G, 238-G
impregnation, 86-E, 230-E, 394-E, 618-E, 623-E, 226-L
inspection, 70-S, 409-S
porosity, 15-E, 33-E, 86-E, 117-E, 570-E
residual stress, 442-Q, 881-Q
segregation, 2-E
shrinkage, 33-E
solidification, 382-E
strength, 629-Q
supersonic inspection, 230-S, 351-S
weight formulae, 445-E, 544-E
welding repair, 54-K, 457-K
x-ray inspection, 285-E, 175-S, 330-S
Cathodic oxide coatings, 334-L
Cathodic protection, 95-R, 137-R, 176-R, 185-R, 205-R, 206-R, 218-R, 244-R, 439-R, 457-R, 458-R, 459-R, 465-R, 476-R. See also under names of structures protected, e.g., Pipes; Ships; Tanks (storage)
current measurement, 5-R
magnesium anodes, 2-R, 246-R
rectifiers, 380-R
system inspection, 201-R
testing, 200-R
zinc anodes, 384-R
Cellini, Benvenuto, 231-E
Cement coatings, 654-L
Cementite, 270-J, 271-J, 225-N, 227-N, 288-N
Centrifugal casting, 197-E, 347-E, 377-E, 391-E, 461-E. See also under specific metal foundry practice.
Ceramic materials, 242-L, 27-V. See also specific ceramic and refractory materials and metals.
coatings on metals, 13-L, 129-L, 145-L, 227-L, 381-L, 483-L, 566-L, 693-L, 695-L, 404-S. See also Porcelain enameling
cutting tools, 113-G, 114-G
emissivity, 566-L
Ceramic materials (cont.)
joining to metals, 294-K
Ceramic-metal compounds, 90-H, 237-N, 770-Q, 93-R
Cerium
extraction, 84-C
oxidation, 92-P
Cerium borides, 256-M
Cesium isotopes, 255-M, 177-P, 266-P 356-S
Chains, manufacture, 190-F, 63-H, 101-J, 24-K, 393-K, 300-T
Chemical coatings. See Chromate coatings; Phosphate coatings
Chemical equipment. See also specific types, e.g., Heat exchangers
construction materials, 226-A, 351-K, 68-T, 78-T, 205-T, 235-T
stainless steel, 91-T, 105-T
corrosion, 29-R, 90-R, 97-R, 187-R, 217-R, 240-R, 367-R, 449-R
Chemistry, solid state, 30-P. See also Electrochemistry
Chemical polishing, 320-L, 387-L, 449-L, 696-L. See also Electrolytic polishing
Chile
coal deposits, 205-B, 207-B
steel industry, 340-D
Chlorine
corrosive action, 569-L, 62-R
in metal reduction processes, 2-C
neutron cross section, 323-P, 324-P
Chromate coatings, 294-L
Chromatography, 166-S, 183-S
Chromite refractories, 43-B
Chromium
determination, 124-S
diffusion, 141-N, 193-N, 259-N
ductility, 297-Q, 664-Q, 853-Q
energy levels, 46-P
forging, 52-R
in cast iron, 247-N
Chromium alloys, 275-M
anodic oxidation, 110-R
brittleness, 575-Q
dissolution potential, 259-G
high temperature behavior, 663-Q
properties, 478-R
rigidity modulus, 107-Q
welding, 614-K
Chromium-antimony alloys, 262-M, 194-P
Chromium carbides, 105-H, 308-M, 133-N
Chromium coatings
friction of porous, 1048-Q
Chromium-copper alloys, 129-V
Chromium diffusion coatings, 231-L, 286-L, 440-L, 645-L

Chromium extraction and refining, 10-B, 199-B, 15-C
Chromium-gold alloys, 259-T
Chromium industry, 180-A
Chromium-iron-molybdenum alloys, 24-M
Chromium-manganese alloys, 108-M
Chromium-molybdenum steel
  stress-rupture, 874-Q
  thermal properties, 157-Q
  transformation changes, 121-N
  welding, 121-N, 990-Q
Chromium-nickel-molybdenum steel, 5-Q
Chromium-nickel powders, 54-H
Chromium-nickel steel, 196-N
  corrosion, 356-R, 383-R
  effect of boron, 30-Q
  nitrogen in, 246-D
  temper brittleness, 138-M
Chromium ores
  concentration, 85-B, 105-B, 140-B
Chromium oxides, 338-M, 328-P
Chromium plate,
  adhesion to base, 735-L
  allotropic transformation, 315-N
  corrosion, 381-R
  effect on steel fatigue, 134-L, 509-L, 140-Q, 569-Q
  protective coatings on, 353-L
  stripping, 738-L
  structure, 326-M, 315-N
  wear resistance, 33-Q, 272-Q, 455-Q, 839-Q
Chromium plating, 134-L, 262-L, 621-L, 736-L
  black plate, 620-L, 728-L
  books, 55-L, 106-L, 496-L, 741-L
  chromate recovery by ion-exchange, 49-A, 50-A, 55-A, 247-L, 399-L, 623-L
  copper cyanide bath, 734-L
  corrugator rolls, 331-L, 455-Q
  costs, 622-L
  equipment, 733-L
  Fescol process, 508-L
  fluoride bath, 706-L, 326-M
  gun barrels, 498-L, 707-L
  literature review, 737-L
  on aluminum, 239-E, 356-L
  quality control, 554-L
  steel mill equipment, 10-L, 604-L
Chromium steel, 13-A, 20-M, 11-T
  annealing welded, 256-J
  anodizing, 206-L
  carbides in, 159-M, 402-M
  corrosion, 173-R, 389-R
  electrochemical properties, 304-P
  embrittlement, 132-N, 171-N
Chromium steel (cont.)
  fabrication, 30-G
  high temperature behavior, 173-R, 389-R
  melting practice, 197-D, 249-D
  martensite reaction, 115-N
  nitrogen in, 58-P
  precipitation, 132-N
  properties, 249-D, 30-G, 71-V
  welding, 256-J, 20-K, 25-K, 242-K, 259-N
Chromium vanadium steel, 95-N, 528-Q
Clad aluminum, 471-R, 74-T, 124-T, 323-T
Clad copper, 66-L
Clad magnesium, 101-R
Clad metals, 195-F, 283-K, 28-L, 829-Q, 302-T
Clad molybdenum, 263-R
Clad steel, 623-K, 48-L, 185-L, 237-L, 505-L, 139-T
  welding, 21-K, 101-K, 284-K
Cleaning, 15-L, 36-L, 428-L, 716-L.
  See also specific cleaning processes; and under specific metals and products
  alkali, 172-L, 180-L, 424-L, 536-L
  bibliography, 493-L
  cleaning compounds, 9-L
    corrosive action, 405-R
    detergency, 658-L
  continuous process, 386-L
  equipment and methods, 326-L, 438-L, 512-L, 720-L
  supersonic method, 252-L, 253-L, 416-L, 516-L
Clothes dryers, 502-L
Coal. See also Coke
  asphalt binders, 203-B
  blending for coking, 91-B, 215-B
  coking additives, 206-B
  flotation, 168-B
  germanium in, 129-T, 3-V
  sulfur removal, 168-B
  washing, 100-B, 204-B
Coal chemicals, 38-T
Coal gas
  corrosive action, 290-R
  thermal cracking, 219-J
Coal gasification, 162-R
Coal tar and pitch, 155-B, 436-E, 495-E, 609-E
Cobalt
  allotropic transformation, 300-M, 421-M, 21-N, 103-N, 233-N
  catalytic activity, 71-H, 306-P
  conservation, 364-T
  diffusion in, 12-N
  electric potential, 290-P
  isotopes, 22-P, 362-P, 127-S, 222-S, 330-S
  martensite reaction, 217-N

Cobalt (cont.)
microstructure, 192-M
superlattice formation, 216-N
Cobalt alloys, 133-M
ferromagnetism, 440-P
high temperature oxidation, 33-R
phase diagrams, 82-M, 133-M
rigidity modulus, 55-P, 107-Q
thermal expansion, 55-P
welding, 185-K
Cobalt extraction and refining, 309-A, 15-C, 121-C, 143-C
Cobalt industry, 181-A, 237-A
Cobalt-iron alloys
annealing, 129-J, 15-P
coercive force, 486-P
galvanomagnetic effect, 392-P
magnetostriction, 15-P
phase diagrams, 209-M, 282-M
Cobalt-iron-sulfur alloys, 209-M, 247-M
Cobalt-nickel alloys, 481-L
electric resistance, 500-Q
Hall effect, 383-P
nitriding, 253-J
Cobalt ores, 24-B, 233-B
leaching, 8-B, 141-B
Cobalt oxides, 92-M, 261-M
Cobalt-platinum alloys, 165-P, 225-P
Coining (machine work), 172-G, 298-G
Coke and coking, 45-B, 77-B, 99-B, 211-B, 168-D. See also specific furnace practice, e.g., Blast furnace practice, coke for
Coke oven gas, 35-D, 138-D
Cold heading. See Heading
Cold treatment, 62-J, 66-J, 123-J, 194-N
Cold welding. See Forge welding
Colombia
steel industry, 214-B
Columbium, 185-A, 68-V
anelasticity, 317-Q
chromatographic separation, 183-S
diffusion in, 164-P
electrochemical potential, 105-P
isotopes, 213-P, 321-P
nitrogen in, 215-N, 164-P
oxygen in, 164-P
single crystals, plasticity, 890-Q
Columbium nitrides, 113-P
Columbium ores, 162-B
Columns. See also Beams
bend strength, 59-Q
buckling, 196-Q, 717-Q, 721-Q, 741-Q, 744-Q, 988-Q
compression, 720-Q, 723-Q
creep, 792-Q
forging, 178-F
Columns (cont.)
maximum load, 719-Q
residual stress, 718-Q
sectional steel, 41-T
strength, 251-Q, 718-Q
stress analysis, 1011-Q
Compressed air. See Air Compressors
Compressibility, 497-P, 676-Q, 1026-Q
Compression, 325-Q, 690-Q, 693-Q, 736-Q, 987-Q. See also under Beams; Columns; Plates; and specific metals and products.
Compression testing, 645-Q
Concrete
mixes, 339-K
prestressed, 63-K, 49-T, 222-T
reinforced, 666-K, 97-T, 248-T
Condensers
tube corrosion, 38-R
Containers, 199-R. See also Cans
aluminum, 487-R, 12-T, 144-T, 145-T, 146-T, 215-T, 306-T
cleaning, 89-L, 199-L
enamel linings, 328-L
fabrication, 195-T
metallizing, 463-L
painting, 205-L
plastic linings, 377-L
protective coatings, 442-L
vacuum-tightness, 165-K
welding, 278-K, 501-K, 651-K
Continuous casting, 10-C, 20-C, 52-C, 62-C, 72-C, 73-C, 115-C, 18-D, 32-D, 369-D. See also specific metal foundry practice.
Control systems, 174-S, 323-S
Controlled atmospheres, 41-J, 65-J, 127-J, 219-J, 241-J, 273-J. See also under specific processes, e.g., Annealing, controlled atmospheres.
Conveyor systems, 95-T, 208-T
Copper
anelasticity, 449-Q
anisotropy, 976-Q
annealing, 112-J, 178-M
creep, 15-Q, 445-Q
determination, 165-S
diffusion, 7-N, 139-N
dissolution, 490-P, 55-R
electric resistance, 325-P, 404-P, 929-Q
electrode potential, 393-P
electrolytic polishing, 236-L
embrittlement, 571-Q
energy distribution of irradiated, 101-P
evaporation from germanium, 459-P
gas adsorption, 128-P, 313-P
in cast iron, 160-Q, 814-Q
in galvanized coatings, 73-R

Copper (cont.)
in steel, 282-F, 378-Q
isotopes, 226-P, 265-P, 478-P
lattice imperfections, 178-M, 325-P
lattice vacancies, 115-P
low temperature behavior, 325-P, 78-Q
microstructure of cold-worked, 172-M
oxidation, 112-J, 171-R, 288-R
plastic deformation, 900-Q, 929-Q, 1035-Q
properties of irradiated, 178-M, 101-P, 226-P, 300-P, 390-P, 15-Q
recovery from silk manufacture, 218-A
recrystallization, 29-N, 130-N, 257-N
resonance energy, 300-P
silver diffusion in, 317-N
stress-rupture, 269-Q
surface tension, 259-P
thermionic constants, 341-P
toxicity, 154-A
twinning, 10-M, 92-N
vapor pressure, 218-P, 310-P
Young's modulus of cold-worked, 449-Q, 453-Q
Copper alloys, 288-T, 303-T, 86-V, 89-V
See also Brass; Bronze
annealing, 79-J, 247-J, 263-J
analysis, 112-S, 225-S
bimetal plates, 47-L, 124-T, 133-T, 323-T
brazing, 3-K, 133-K
corrosion, 32-R, 158-R, 306-R, 333-R, 354-R, 455-R, 456-R
creep, 481-Q, 877-Q
diffusion, 166-N
drawing, 133-K
electrolytic polishing, 423-L, 525-L
extrusion, 257-F
hardness, 19-J, 475-Q, 812-Q
high temperature behavior, 877-Q, 63-R, 419-R
in buildings, 279-T
in busbars, 36-T
in electric conductors, 181-T
in electric contacts, 224-T
in instruments, 366-T
lattice vacancies, 166-N
lead-plated, 66-L
oxidation, 63-R, 334-R, 419-R
passivation, 691-L
phase diagrams, 94-N, 38-P
pickling, 8-L, 157-L
piercing, 257-F
plastic deformation, 825-Q
pressing, 300-G, 416-G
properties, 161-P, 444-P, 329-T, 92-V
radiation damage, 390-P
recrystallization, 92-N, 297-N
Copper alloys (cont.)
review, 30-V
rigidity modulus, 371-Q
roll-forming, 70-G
rolling, 219-F, 825-Q, 173-S
selection of, 332-T
soldering, 15-K, 301-K
specifications, 347-S, 382-S
weldability, 507-K, 687-K
welding, 99-K, 392-K, 455-K, 489-K, 638-K
welding, arc, 275-K, 493-K, 632-K
welding, inert arc, 75-K, 117-K, 352-K, 483-K, 647-K
working, 112-V
wrought, 44-S
Copper-aluminum alloys. See Aluminum-copper alloys
Copper-antimony alloys, 18-Q
Copper-bismuth alloys, 38-P
Copper-chromium alloys, 487-Q
Copper extraction and refining, 19-B, 20-B, 25-B
bismuth recovery, 36-C
deoxidation, 14-C
ingot-casting, 101-C, 157-C, 167-C
manganese reactions, 3-C
quality control, 49-C
recovery from slag, 38-C, 74-C
smelting, 54-C, 75-C, 77-C, 78-C, 165-C
smelting furnaces, 127-C, 142-C
arc, 30-C
Copper foundry practice, 259-E, 504-E, 537-E, 554-E, 569-E, 615-E
continuous casting, 101-C, 167-C
copper oxide additions, 581-E
deoxidation, 212-E, 581-E
grain refinement, 264-E
shell molding, 187-E
temperature measurement, 381-S
Copper-gold alloys
superlattice formation, 14-M, 11-N, 13-N, 135-N, 157-N, 310-N, 311-N, 314-N, 226-P
Copper-indium alloys, 41-M, 168-M, 234-M
Copper industry, 79-A, 81-A, 143-A, 113-V
directory, 171-A
new construction, 233-A
prices and supply, 164-A, 198-A
Copper-iron alloys
diffusion, 123-P
precipitation, 183-N
Copper-iron-sulfur alloys,
phase diagrams, 131-M
Copper-lead alloys, 38-P, 921-Q
Copper-manganese-antimony alloys, 94-N
Copper-manganese-indium alloys, 168-M

Copper-manganese-nickel alloys, 48-N
Copper-manganese-silicon alloys, 204-M
Copper-manganese-tin alloys, 176-M, 191-M, 344-M
Copper-nickel alloys, 68-P, 189-P, 302-P, 474-R
Copper-nickel-silicon alloys, 1-Q, 1-R
Copper-nickel-tin alloys, 172-G
Copper ores, 25-B, 60-B, 63-B
  concentration, 158-B, 179-B
  grinding, 36-B, 107-B, 150-B
  roasting, 189-B
  leaching, 9-B, 64-B, 76-B, 127-B, 141-B
  lead recovery, 136-B
Copper plate, 623-K, 99-L, 124-T, 133-T
Copper plating, 195-F, 683-L
  bindarine additions, 265-L
  effect of chloride ion, 672-L
  monoethanolamine bath, 277-L
  on aluminum, 47-L, 323-T
  on steel, 460-L, 589-L, 637-L
  periodic-reverse current, 633-L
  waste treatment, 81-L
Copper-platinum alloys
  superlattice formation, 72-N
Copper powders, 33-H, 44-H, 236-L
Copper scrap, 284-S
Copper-silicon alloys, 161-Q
Copper-silver-indium alloys, 41-M
Copper sulfide, 333-R
Copper-thallium alloys, 38-P
Copper-tin alloys, 69-N
Copper-zirconium alloys, 72-M, 73-M, 320-M
Corrosion, 34-R, 53-R, 57-R, 76-R, 112-R, 119-R, 152-R, 207-R, 231-R, 255-R, 281-R, 360-R, 370-R, 486-R. See also Oxidation; Stress Corrosion; specific corrosive agents and specific metals and products
  ASTM research, 403-R, 404-R
  aqueous, 161-R, 169-R, 242-R, 307-R, 376-R, 421-R, 466-R
  atmospheric, 143-R, 153-R, 261-R, 295-R, 331-R, 345-R, 346-R, 403-R, 451-R
  bacterial, 46-R, 83-R, 116-R, 131-R, 142-R, 156-R, 178-R, 239-R, 247-R, 259-R, 292-R
  Belgian research, 78-A
  books, 27-R, 450-R
  British research, 58-R, 257-R
  cast vs. wrought alloys, 407-R
  cavitation, 91-R
  corrosion engineers, 103-R, 104-R
  design factors, 49-R
  electric models, 328-R
  electrode potentials, 437-P, 88-R
Corrosion (cont.)
  filiform, 374-R
  fretting, 36-R
  galvanic, 65-R, 82-R
  high temperature, 37-R, 242-R, 376-R
  historical review, 460-R
  intergranular, 121-R
  polarization curves, 10-P, 167-R
  relation to structure, 125-R
  scaling, 134-R, 302-R
  sea water, 42-R, 117-R, 223-R, 239-R, 391-R, 474-R
  soil, 19-R, 28-R, 139-R, 454-R, 455-R, 456-R, 495-R
  statistical analyses, 50-R
  stray currents, 265-R, 329-R
  testing, 393-R
    accelerated, 59-R, 124-R, 382-R
    coupons, 75-R
    etching, 126-R
    interferometry, 264-R, 432-R
    literature review, 226-R
    radiometric, 130-R
    rotor technique, 224-R
    supersonic inspection, 315-R
    surface changes, 347-R
Corosion inhibitors, 18-R, 85-R, 102-R, 283-R, 349-R, 352-R, 399-R
  amines, 260-R, 308-R
  bentonite, 418-R
  chromates, 20-R, 190-R
  organic, 294-R, 378-R
  phosphates, 11-R, 142-R, 307-R
  sodium benzoate, 179-R, 258-R
  sodium nitrite, 179-R
  testing, 47-R, 193-R
Corrosion passivation, 106-R, 111-R, 188-R, 234-R
Corrosion-resistant alloys, 297-R, 316-R, 19-T, 356-T. See also specific alloys.
Cost accounting, 162-A
Cranes and hoists, 203-A, 204-A, 205-A, 160-T, 256-T
Crankshafts
  casting, 503-E
  cleaning, 21-J
  failure, 659-Q
  forging, 9-F
  gaging, 9-S
  heat treatment, 21-J, 210-J
  supersonic inspection, 329-S
Creep, 137-Q. See also under specific metals and products.
  anelasticity, 284-Q
  cubic creep function, 561-Q
  effect of impurities, 12-Q
  effect on stress, 740-Q, 954-Q

Creep (cont.)
grain boundary effects, 171-Q
in bending, 742-Q
in cold working, 821-Q
in compression, 308-Q
in pin-joints, 743-Q
in tension, 308-Q, 426-Q
mathematical analysis, 415-Q
plasticity in, 784-Q
recovery, 875-Q
relation to chemical constitution, 763-Q
review, 724-Q
temperature effects, 172-Q, 305-Q
testing, 21-Q, 76-Q, 158-Q, 227-Q, 237-Q, 348-Q, 404-Q, 574-Q, 621-Q, 678-Q
theory of, 552-Q, 788-Q, 801-Q
time laws, 52-Q, 158-Q, 305-Q
Crushing, 5-B, 31-B, 49-B. See also Ball Mills; and under specific ores.
Crystals, 28-M, 207-M, 272-M, 290-M, 314-M, 210-N. See also X-ray diffraction
aggregates, 393-M, 420-M
bonding, 66-P
corner-sharing, 214-M, 393-M, 420-M
correlation of outer electrons, 311-M, 337-M
cubic, 426-M
cutting and shaping, 212-M
diffusion in, 63-N
dislocations
boundary interactions, 87-M
density of, 215-M
equation of motion, 46-M, 171-M
etching, 99-M
geometry of, 140-M
lattice distortion, 248-M
model, 195-M, 823-M
nodes, 245-M
screw-type, 13-M, 103-M, 171-M
splitting, 425-M
stresses in, 61-M, 499-Q
Doppler components, 12-P
electron density distribution, 177-M
energy levels, 379-M, 67-P
growth, 277-M, 288-M, 10-N, 53-N, 63-N, 203-N
dislocation theory, 13-M, 235-M, 304-M, 31-N, 82-N
hexagonal close-packed, 60-M
internal boundaries, 45-M
lattice spacing, 304-M, 370-M
models, 155-M, 265-M
orientation, 56-M, 58-M, 90-M, 197-M, 238-M, 272-M, 285-M
plastic deformation, 198-M, 339-M, 31-N, 179-Q, 539-Q
polygonization, 410-M
Crystals (cont.)
radii, 184-M
structure factor, 321-M
symmetry, 145-M, 274-M
texture studies, 104-M
torsion strains, 198-M
transmission factor, 264-M
twinning, 641-Q
Crystals, single, 355-M
Barkhausen effect, 462-P
creep, 801-Q
growth, 40-N, 124-N, 218-N, 294-N
plastic deformation, 637-Q
x-ray reflections, 266-M
Cupola furnaces, 257-E, 410-E, 420-E, 600-E
air feed, 209-E
air pollution, 59-E, 101-E, 142-E
charging, 106-E, 357-E
coal-fired, 501-E
combustion rate, 434-E
hot-air gas-generator, 90-E
linings, 124-E, 545-E
acid vs. basic, 409-E, 474-E
basic, 129-E
carbon, 10-E
repair, 370-E
slag attack, 134-E
tap-hole, 456-E
temperatures in, 300-E
tuyeres, 256-E, 518-E
water-cooling, 315-E
Cupola practice, 38-E, 58-E, 144-E, 290-E, 433-E, 587-E, 589-E, 611-E
calcium carbide additions, 506-E, 535-E
carbon pick-up, 424-D, 584-E
charge composition, 647-E
deoxidation, 415-G
dephosphorization, 167-E
fluxes, 378-E
hot blast, 270-E, 463-E, 464-E
scrap iron charge, 599-E
Curium, 282-P
Cutting fluids, 225-F, 28-G, 69-G, 139-G, 403-G, 411-G. See also under specific processes, e.g., Grinding; and under Drawing (metal); Wire drawing
carbon dioxide coolant, 92-G, 173-G, 255-G, 269-G
oils, 49-G, 293-G
reclamation, 195-A, 73-G
refrigerated coolants, 49-G, 245-G
selection, 317-G
spray cooling, 328-G
testing, 248-G
wax lubricants, 132-G

Cutting tools. See also Carbide tools; and specific cutting processes
ceramic, 113-G, 114-G
manufacture, 114-E
shot peening, 783-Q
thermal stresses, 246-G
wear, 243-Q, 913-Q, 914-Q
weld-deposited coatings, 689-K
Cyanide wastes. See Electroplating, waste treatment
Cylinders, 709-Q
bending, 563-Q
casting, 576-E
compression, 696-Q
impact, 547-Q
reconditioning, 500-K
residual stresses, 240-Q, 369-Q, 396-Q
shear, 311-Q
strength, 786-Q
stress analysis, 118-Q, 267-Q
torsion, 578-Q, 631-Q, 714-Q
welding, 338-K
Damping, 234-Q, 497-Q, 545-Q, 548-Q, 549-Q, 604-Q, 686-Q, 691-Q
statistical mechanics, 685-Q
testing, 129-Q, 587-Q, 603-Q
Dams (hydraulic), 221-T
gate guards, 164-T
gates, welding, 615-K
Deformation (mechanics). See Plastic deformation; Elasticity; Strains and Stresses
Degreasing, 130-L, 290-L, 366-L, 636-L, 681-L, 180-T
Detergents
corrosive action, 183-R
Diamond tools, 31-F, 263-G, 385-S, 98-T
Diamonds,
abrasives, 29-G, 321-G, 394-G, 105-M, 233-M
slip in, 299-P
Die casting practice, 41-E, 335-E, 369-E, 555-E, 583-E, 595-E, 622-E. See also specific metals, e.g., Aluminum die casting practice.
automation, 30-E
cold-chamber injection, 74-E, 155-E, 519-E
cores, 249-E
Cothias process, 235-E
dies
cost, 465-E
dressing, 151-E
heat control, 53-E
lubricants, 334-E, 559-E, 598-E
protective coatings, 123-L
testing, 353-E
Die casting practice (cont.)
gating, 510-E
gravity die, 500-E, 521-E
inserts, 361-E, 362-E
molds, 200-E
plant layout, 551-E
pressure die, 238-E, 364-E, 471-E, 652-E
Die castings, 319-E, 321-E, 323-E, 327-E, 336-E. See also specific metals, e.g., Aluminum die castings
bonding to non-metals, 325-E
compared with extrusions, 390-E
cost of, 400-E
defects, 148-E, 468-E
design, 199-E
in automobiles, 344-T
in cameras, 406-E, 452-E
in dictaphones, 75-E
in duplicators, 154-E
in locks, 596-E
in typewriters, 524-E
machining, 371-G
press trimming, 313-G
shot peening, 100-G
specifications, 348-S
Dielectric heating, 50-E, 89-E, 90-P. See also Induction heating
Dielectrics, 223-P, 405-P, 100-T
Dies, 24-G, 180-G, 301-T. See also under specific processes, e.g., Drawing (metal)
carbide, 35-H, 121-T
casting, 228-E
die plates, 72-G
grinding, 1-G
inspection, 229-S
maintenance, 216-G
plastic, 104-G
protective coatings, 123-L
progressive, 140-G, 277-G
steel, 175-T, 128-V
wear, 66-G, 178-G
welding repair, 335-K
Diesel engines
aluminum parts, 18-T, 189-T, 253-T
bedplates, 186-K
cast iron parts, 273-E, 488-E, 607-E
cooling system corrosion, 399-R
forged parts, 3-T
welding, 473-K, 676-K
welding repair, 505-K
Diffusion (metal), 38-N, 212-N, 235-N, 433-P. See also under specific elements, e.g., Chromium, diffusion.
activation entropies, 42-N
coefficient of, 142-N, 240-N, 252-N, 260-N
effect on lattice stability, 238-N

Diffusion (metals) (cont.)
in alloy systems, 177-N, 237-N, 296-N
in corrosion, 328-R
in crystal growth, 63-N
in oxidation, 128-N, 134-R
ionic, 139-N
polygonization in, 26-N
Rayleigh, in crystals, 138-N
self-diffusion, 55-N, 221-N
thermodynamics of, 305-N
vacancy formation, 166-N
Diffusion coatings, 200-L, 440-L, 453-L, 520-L, 528-L, 645-L, 686-L, 52-M, 36-N. See also specific metals, e.g., Chromium diffusion coatings
Dip coatings, 697-L. See also specific metals, e.g., Tin coating
Domestic appliances, 162-G, 466-L
Drawing (metal), 214-F, 88-G, 297-G, 181-S. See also Shells (metalwork); Sheet metalwork; Tubes; Wire drawing; and under specific materials, e.g., Steel, drawing.
back-pull, 51-F, 408-G
compared with spinning, 133-G, 286-G, 402-G
die pressure, 246-G
dies, 230-G, 304-G, 326-G, 329-G, 400-G, 314-S
draw benches, 36-F
drawability test, 150-Q, 268-Q
drawing compounds, 173-F, 108-G
precision cold drawing, 268-G
presses, 36-F, 75-G, 134-G
stress calculations, 40-G, 408-G
Drilling and reaming, 118-G, 387-G
diamond bits, 98-T
speeds, 208-G
welding repair, 130-K
Drills and drilling (earth and rocks), 102-Q, 84-T. See also Oil well equipment
bits, 152-T
heat treatment, 73-J, 195-J
hose units, 13-T
service tests, 6-S
Ductility, See Fracture, brittle, and under specific metals and materials.
Duplexing practice, 329-D
Dust control, 302-A. See also Air pollution; and under Foundries; Steel mills
Dysprosium
electrical properties, 196-P
expansion, 485-P
isotopes, 275-P
magnetic properties, 196-P, 484-P
Earth moving equipment, 268-K, 429-L
Elasticity, 91-Q, 407-Q, 690-Q
Elasticity (cont.)
anisotropy, 499-Q
books, 44-Q, 121-Q, 264-Q
boundary-values, 443-Q
constants, determination, 640-Q, 651-Q, 652-Q, 657-Q
edge dislocations, 984-Q
Hooke's law, 438-Q
limit load theorems, 733-Q
microstructure effects, 680-Q
modulus, 346-Q, 573-Q, 602-Q, 650-Q, 840-Q
Poisson's ratio, 380-Q
preferred orientation effects, 370-Q
relation to temperature, 816-Q
spherical shells, 695-Q
tangential force effects, 694-Q
testing, 944-Q
Electric circuits, printed, 493-L
Electric conductors, 256-L, 472-L, 312-P, 351-P, 26-S, 140-T, 143-T, 173-T, 181-T. See also Electric resistance, Intermetallic compounds; Semiconductors; Transistors and under specific metals and products.
Electric connections, 326-K, 402-K, 584-K, 118-T
Electric contacts, 199-T, 201-T, 224-T
bibliography, 97-P
corrosion, 335-R
metal migration, 291-P
surface films, 210-R, 346-R
Electric dipoles, 227-P
Electric furnace, 86-C, 132-C, 159-C, 10-D, 116-D, 644-E, 75-J
construction materials, 236-Q, 232-T
Electric furnace, arc, 106-D. See also Electric furnace steel making
electrode control, 245-D, 302-D
electrodes, self-baking, 49-D
foundry melting, 61-C, 141-C, 123-D, 13-E
linings, 70-D, 243-D, 252-D
optimum current, 300-D
power supply, 87-D, 266-D
roof insulation, 105-E
swivel roof, 494-E
Electric furnace, induction, 310-D, 458-E, 648-E, 225-J
container-less, 6-C
coreless, 170-C
generators, 459-E
induction stirring, 147-C
Electric furnace, resistance, 556-E, 291-S
Electric furnace steel making, 20-D, 45-D, 91-D, 106-D, 285-D, 339-D, 345-D, 368-D. See also under Steel, molten

Electric furnace steel making (cont.)
chromium additions, 10-B, 7-D
compared with openhearth, 31-D, 40-D, 68-D, 196-D, 298-D
direct reduction from ore, 199-D, 264-D, 316-D, 317-D, 324-D, 325-D
induction stirring, 46-D, 59-D, 137-D, 195-D
misch metal additions, 118-B, 225-D
oxygen enrichment, 92-D, 107-D, 253-D
production rates, 89-D
reducing period, 273-D
Electric furnace steel slag, 63-D
Electric generators, 248-E, 59-S, 297-T
Electric insulating materials, 344-E. See also Dielectrics
Electric lighting fixtures, 426-L
Electric motors, 316-T
Electric rectifiers, 175-L, 287-M, 380-R, 321-T
Electric resistance, 287-M, 85-P, 301-P, 312-P, 443-P, 447-P. See also Electric conductors; Transistors; and specific metals and alloys.
effect of deformation, 510-P
measurement of, 388-S, 259-T
resistance diagrams, 436-P
thin plates, 346-P, 446-P
Electric resistance alloys
specifications, 346-S
Electric switches, 404-E, 629-L
Electrochemistry, 11-C, 183-L, 134-P, 137-P, 271-R
economic survey, 266-A
Electrodepositors' Technical Society Journal, 182-L, 338-L
Electrodes, welding, 115-K, 413-K, 440-K, 514-K, 562-K, 577-K, 583-K, 622-K, 684-K
coatings, 84-K, 102-K, 183-K, 643-K, 659-K, 660-K, 704-K
deposition rates, 681-K
"Fusarc", 662-K
Electrodes, welding
high manganese, 253-K, 492-K
low-hydrogen, 50-K, 146-K, 191-K, 460-K, 642-K, 680-K
review, 515-K, 531-K, 652-K
rotating, 484-K
testing, 317-K, 445-K
Electroforming, 85-F, 115-L, 589-L, 608-L
Electrolysis, 4-C, 42-C, 11-P
Electrolytic polishing, 49-L, 126-L, 153-L, 271-L, 312-L, 387-L, 449-L, 696-L, 217-M. See also under specific metals and products
Electrolytic polishing (cont.)
amphoteric metals, 245-L
current distribution, 101-L
effect on fatigue, 458-L
fused salt, 350-L
mechanism of, 719-L
rate-determing factor, 669-L
surface luster, 567-L
Electron diffraction, 193-M, 269-M, 356-M 414-M, 426-M
Electron microscopy, 66-M, 183-M, 194-M, 232-M, 279-M, 324-M, 341-M. See also under Surfaces
direct measurement, 181-M
intensity determination, 182-M
recording methods, 424-M
replicas, 200-M, 201-M, 286-M, 315-M, 349-M, 404-M, 405-M
review, 163-M
objectives, 165-M, 180-M
secondary emission, 365-M
specimen mounts, 252-M
specimen contamination, 154-M
Electron tubes, 266-G, 227-T, 247-T, 362-T
Electroplate, 390-L, 409-L, 187-S
density, 21-P
effect on fatigue, 66-Q, 569-Q
porosity, 280-L, 624-L, 700-L, 369-S
specifications, 587-L
stripping, 594-L, 724-L
structure, 283-L, 248-M
surface roughness, 506-L
thickness measurement, 61-L, 335-L, 55-S, 179-S, 288-S
Electroplating, 37-L, 38-L, 182-L, 192-L, 305-L, 359-L, 558-L, 614-L, 651-L
anodes, 544-L
anodic polarization, 668-L
bath additions, 41-L, 424-L
bath analysis, 40-L, 348-L
bath filtration, 2-L, 62-L, 186-L
bath temperature, 195-L
books, 655-L, 656-L, 657-L
bright plating, 450-L, 670-L
carbonate removal, 626-L
cathode current distribution, 121-L
cleaning for, 214-L, 720-L
current control, 523-L, 592-L
current flow lines, 454-L
cyanide decomposition, 625-L
diffusion in, 453-L
direct current, 521-L
hydrogen overvoltage, 174-L
Japanese practice, 308-L
metal distribution, 550-L
potassium additions, 424-L

Electroplating (cont.)
quality control, 548-L, 554-L
research, 411-L
reversible deposition, 147-L
review, 91-L
salts, metal content, 42-L
skin eczema, 149-A
sodium additions, 424-L
waste treatment, 47-A, 48-A, 52-A, 53-A, 56-A, 124-A, 155-A, 146-L, 400-L, 403-L, 412-L
ion-exchange, 51-A, 147-A, 616-L
oxidation, 240-A
water treatment, 47-A, 191-L
Electroplating equipment
rectifiers, 175-L
tanks, 114-L, 434-L
Electroplating plants, 34-L, 78-L, 610-L, 635-L
construction materials, 404-L, 405-L
instrumentation, 410-L
mechanization, 345-L
Electro Tinning. See Tin plating
Electrotyping, 6-L
Enameling. See Porcelain enameling
Engines, 42-C, 54-Q. See also Aircraft engines; Automobile engines; Diesel engines; Jet propulsion engines.
lubrication, 30-R
plated parts, 510-L
Equilibrium diagrams. See Phase diagrams.
Erbium, 196-P
Etching, 93-M, 99-M, 114-M, 192-M, 287-M
Europe
aluminum industry, 213-A
foundry industry, 540-E
metal industry, 217-A, 261-A
steel industry, 91-A, 186-A, 243-A, 273-A, 172-B
zinc industry, 142-A, 278-A
Extrusion, 390-E, 5-F, 8-F, 88-F, 114-F, 234-F, 246-F, 797-Q. See also under specific metals and products.
billet heating, 12-F
cold, 124-F, 188-F, 392-G, 194-T
glass lubricant, 84-E
impact, 169-G, 281-G, 305-G, 375-G, 392-G, 194-T
Fans (cooling and ventilating), 250-G, 467-K, 420-L, 167-T
Farm machinery, 128-G, 132-J, 341-T
aluminum, 275-T
welding, 33-K, 485-K, 535-K
Fasteners, 273-K, 313-K, 380-K, 426-K. See also specific types of fasteners, e.g., Rivets and Riveting
Fasteners (cont.)
heat treatment, 202-J, 216-J
Fatigue, 96-Q, 151-Q, 194-Q, 314-Q, 746-Q, 930-Q, 931-Q. See also under specific metals and products.
ASTM study, 871-Q
books, 45-Q, 190-Q
cracking, 274-Q, 292-Q, 926-Q
dimensional effects, 119-Q
effect of polishing, 458-L
effect of pressure, 273-Q
grain size and sensitivity, 866-Q
in aircraft, 933-Q
in engines, 932-Q
literature review, 148-Q
Orowan theory, 72-Q
statistical analysis, 832-Q, 1027-Q
structural changes, 258-Q
x-ray study, 755-Q
Fatigue testing, 348-Q, 996-Q, 1009-Q
high temperature, 356-Q, 644-Q
resonance method, 1013-Q
single crystals, 747-Q
statistical analysis, 257-Q, 804-Q
Fatigue testing machines, 74-Q, 234-Q, 237-Q, 454-Q, 486-Q, 607-Q, 610-Q, 661-Q
Ferrite, 196-N, 123-Q
analysis, 21-M
plastic deformation, 405-Q, 969-Q
Ferrite steel
creep, 123-Q, 178-Q, 195-Q,
Ferrites, see Ferrospinels.
Ferroalloys, 72-B, 85-B, 167-B, 188-B, 220-B, 114-C, 293-D, 230-N
Ferromagnetic materials, 168-M, 54-P. See also specific alloys.
coercive force, 154-P, 209-P
collective electron theory, 88-P, 193-P, 202-P
Curie point, 345-P
damping, 548-Q
domain structure, 172-P, 199-P, 399-P
Hall effect, 72-P, 200-P
heat effects in magnetization, 187-P, 417-P
magnetic measurements on, 308-P
magnetic saturation, 182-P
quantum theory of, 74-P
spin-lattice relaxation, 24-P, 25-P, 56-P
spin-orbit coupling, 422-P
spin waves, 171-P
spontaneous magnetization, 189-P, 483-P
structure and properties, 1-M, 155-P, 186-P
theory of, 357-P
Ferrophosphorus, 45-C

Ferrosilicon, 304-D
Ferrospinels, 440-P
domain theory, 172-P
magnetic measurements, 330-P
neutron diffraction, 243-M
resonance absorption, 272-P
specific heat, 382-P
spontaneous magnetization, 189-P, 271-P
Ferrous hydroxide, 100-R
Files and rasps, 317-L
Films, photographic, 37-T
Filters, 32-H, 68-H, 314-R, 32-T
Finishing, 11-L, 58-L, 59-L, 93-L, 507-L
See also Abrasives; Protective coatings; and specific finishing operations
costs, 112-L, 671-L
guidebook, 108-L
quality control, 148-L, 234-L, 103-S
selection of finish, 476-L
surface preparation, 35-L, 36-L, 716-L
waste reduction, 1-A
Firebrick, 115-D, 136-D
Fire fighting equipment
corrosion, 256-R
Fits (machinery), 62-J, 254-K
Flame cleaning, 102-G
Flame cutting, 253-F, 184-G, 199-G, 306-G, 308-G, 377-G. See also under specific metals and products
automatic, 200-G, 367-G
coolants, 95-G
equipment, 46-G, 524-K
grooving, 123-G
powder cutting, 109-G
temperature distribution, 219-G
templates, 282-G
Flame hardening, 13-J, 17-J, 44-J, 49-J, 61-J, 130-J, 249-J, 258-J, 264-J, 585-Q See also under specific metals and products
Flame plating. See Tungsten carbide coatings; Weld-deposited coatings
Flame spraying. See Metal spraying, metallizing
Flames, radiation, 16-B
Flotation, 17-B, 176-B. See also Heavy media separation; and under specific ores.
froth-formation, 92-B, 229-B
slime coatings, 104-B
tall oil, collector, 32-B, 87-B, 170-B
Flow meters, 248-S, 322-S
Flue gas
corrosive action, 12-R, 174-R, 221-R, 386-R
Fluids, theory of, 124-P, 301-Q
Fluorescence analysis, 1-S, 121-S
Fluorides, 146-C, 153-C
Fluorine, 184-P
Fluoroscopic inspection, 3-M, 13-S, 28-S, 135-S, 196-S
Fluorspar, 125-B
Flux welding. See Submerged arc welding
Fluxes. See under Brazing; Solders and soldering
Forge welding, 162-K, 179-K, 252-K, 342-K, 350-K, 360-K, 427-K, 441-K, 639-K
Forging furnaces, 25-F, 97-F, 181-F, 235-F, 155-J, 84-J
Forging practice, 5-F, 37-F, 79-F, 162-F, 243-F, 254-F, 201-G. See also under specific metals and products
automation, 10-F, 56-F
costs, 141-F
die sinking, 18-F
dies, 170-F
hammer capacity, 210-F
hammer impact, 281-F
impacting, 6-G, 17-F, 154-F
materials handling, 113-F
metal conservation, 180-F
presses, 34-F, 39-F, 59-F, 96-F, 125-F, 128-F, 131-F, 169-F, 176-F, 212-F
tolerances, 264-F
Forgings
See also specific metal forgings
alloys, 136-F
defects, 211-F
testing, 242-S
Foundries, 309-E, 392-E
apprentice training, 72-A
cost control, 77-A, 360-E, 435-E, 502-E
dust control, 74-A, 108-A, 252-A, 101-E, 126-E, 142-E, 356-E
equipment maintenance, 75-A
statistical survey, 7-E, 265-E
particle count, 213-E, 529-E
equipment and layout, 476-A, 97-E, 305-E, 314-E, 457-E, 586-E
France, 275-E
graphs, control use, 368-E, 469-E
industrial relations, 412-E
instrumentation, 120-S
maintenance, 414-E
materials handling, 350-E, 579-E, 629-E
mechanization, 204-E, 286-E, 477-E, 497-E, 499-E
safety, 71-A, 118-A
sand conveyers, 350-E
waste control, 76-A, 142-A

Foundry practice, 9-E, 149-E, 176-E, 255-E, 267-E, 277-E, 280-E, 312-E, 375-E, 442-E, 466-E, 582-E. See also Centrifugal casting; Continuous casting; Cupola practice; Die casting; Precision investment casting; and specific metal founding, e.g., Copper foundry practice
AFA transactions, 164-E
chilled mold, 222-E
cooling rates, 2-E
core baking, 78-E, 123-E, 253-E, 282-E, 317-E, 493-E
dielectric, 50-E, 89-E, 450-E
heated core boxes, 244-E, 383-E
core binders
drying oils, 146-E
resins, 31-E, 40-E, 42-E, 450-E, 549-E
water glass, 483-E
cores, 60-E, 65-E, 69-E, 195-E, 307-E, 470-E, 572-E, 632-E
dipping, 447-E
finishing, 291-E
gas evolution, 80-E, 246-E
veining, 296-E
crucibles, 534-E
equipment, fatigue, 273-Q
heat transfer in, 169-E, 222-E
impregnation, 86-E
ingot specifications, 100-C
lubrication, 601-E
materials conservation, 311-E
melting furnaces, 27-E, 32-E, 203-E, 571-E
arc, 123-D
coke, fuel, 134-B, 87-E, 260-E
induction, 239-D, 88-E, 181-E
reverberatory, 133-E, 141-E, 245-E, 318-E, 576-E
mold reactions, 33-E, 108-E
molding machines, 83-E, 84-E, 180-E, 286-E, 472-E
molds, 162-E, 247-E, 533-E, 536-E, 632-E, 650-E
cars, 432-E
coatings, 55-E, 379-E
conveyors, 286-E
drying, 455-E
high pressure, 443-E, 532-E
models, 411-E
standards, 438-E
strength, 462-E, 513-E, 610-E
thermal conductivity, 448-E
wear, 479-E
operational research, 451-E
patterns, 39-E, 243-E, 478-E, 536-E
design, 25-E, 543-E
metal, 135-E
Foundry practice (cont.)
patterns (cont.)
shrink allowance, 132-E
wood, 158-E, 634-E
permanent mold, 85-E, 110-E, 331-E, 402-E
plaster casting, 14-E, 128-E, 233-E, 328-E, 333-E
pouring, 137-E, 261-E, 272-E, 446-E
quality control, 444-E, 78-S, 79-S, 80-S, 81-S, 241-S, 384-S
refractories, 56-B, 133-E
research, 111-E
rigging
gating, 71-E, 118-E, 168-E, 294-E
heading, 91-E
risers, 63-E, 102-E, 112-E, 120-E, 140-E, 160-E, 630-E
selection of method, 548-E
shakeout and trimming, 254-E
shell molding, 6-E, 21-E, 52-E, 61-E, 159-E, 196-E, 349-E, 385-E, 386-E, 423-E, 426-E, 538-E, 539-E, 557-E, 563-E, 573-E, 608-E, 643-E
back-ups, 637-E
compared with precision casting, 343-E, 592-E
costs, 72-E, 453-E
equipment, 4-E, 384-E, 520-E
mold clamps, 236-E, 419-E, 642-E
molding machines, 17-E, 62-E, 405-E, 429-E, 641-E
patterns, 20-E, 206-E
plant layout, 305-E, 586-E
resins, 95-E, 188-E, 223-E, 292-E
slush casting, 399-E
standards, 299-E
supersonic vibration, 82-E, 93-E, 382-E
textile industry, 547-E, 612-E
time and motion studies, 127-E
Foundry sand, 67-E, 283-E, 287-E, 292-E, 373-E, 530-E, 531-E
binding strength, 513-E
binders, 165-E
cement, 3-E
clay, 8-E, 130-E, 372-E, 430-E, 481-E, 515-E, 517-E, 574-E, 578-E
dehydration, 514-E
pitch, 436-E, 495-E, 609-E
synthetic, 104-E, 239-E
chemical hardening, 565-E
coal additions, 346-E
conservation, 247-E
control, 96-E, 628-E
conveyer systems, 350-E
deformation, 293-E
drying, 437-E

Foundry sand (cont.)
effect on casting defects, 567-E
fineness, 113-E
flowability, 205-E, 289-E, 418-E, 619-E
high temperature behavior, 119-E, 125-E, 431-E
hot strength, 1-E
moisture content, 51-E, 636-E
olivine, 60-E, 138-E, 156-E
ramming, 297-E
reclamation, 152-E, 157-E, 195-E, 242-E, 351-E, 475-E
specifications, 602-E
testing, 136-E, 147-E, 572-E, 603-E, 625-E
Fractography, 408-M
Fracture, 45-Q, 1038-Q
elastic strain waves, 427-Q
high temperature, 356-Q
low temperature, 521-Q
origin of, 355-Q
Fracture, brittle, 31-Q, 470-Q, 613-Q, 878-Q, 997-Q, 1047-Q
causes, 632-Q
deformationless, 1019-Q
delayed, 104-Q
grain size effect, 478-Q
heat treatment effect, 992-Q
in welds, 263-K, 511-K
mechanics of, 456-Q
notch brittleness, 164-Q, 326-Q, 861-Q
pearlite spacing, 965-Q
propagation, 56-Q, 154-Q
residual stress in, 74-K
single crystals, 794-Q
stress ratios, 1041-Q
testing, 461-Q, 942-Q
transition temperature, 141-Q, 938-Q
France
aluminum industry, 254-A, 18-S
foundry industry, 275-E
metal industry, 208-A
metallurgical research, 104-A
welding, inert arc, 124-K
Friction, 769-Q. See also Wear.
coefficient of, 225-Q, 684-Q, 989-Q
fretting, 989-Q
heating in, 466-P
plastic deformation, 773-Q
sliding surfaces, 249-Q, 292-Q, 847-Q
Friction, internal. See Anelasticity
Fuel oil. See Oil, fuel
Fuels. See specific fuels, and under specific furnaces and furnace processes.
Furnaces, 307-A, 28-D, 71-F, 87-F, 261-T. See also specific furnaces and under Foundry practice
Furnaces (cont.)
construction materials, 423-P
control, 644-Q, 372-S
European, 239-A
heat recovery, 6-T
heating tube failure, 62-S
oil-fired, 183-J
reheating, 161-F, 167-F, 181-F
reverberatory, 44-D
Furniture manufacture, 340-K, 94-T
painting, 221-L, 699-L
Fused salts, 5-C, 472-P, 241-R
Gadolinium, 196-P, 203-P, 384-P, 485-P
Gages, 202-S, 231-S, 265-S, 321-S, 324-S. See also Strain gages
angle block calibration, 327-S
automatic, 16-S, 255-S, 374-S
comparators, 32-S, 34-S
gage blocks, 4-S, 19-S
electromagnetic, 286-S
maintenance, 269-S
pneumatic, 9-S, 284-S
spline, 338-S
standardization, 215-S, 310-S
tolerance relations, 359-S, 395-S
Gallium
electrochemistry, 120-P
isotopes, 369-P, 387-P
metal solubility in, 153-N
review, 43-V, 93-V
specific heat, 83-P
vapor pressure, 133-P
Gallium-silicon alloys, 153-N
Galvanized sheet, 218-T
corrosion, 24-R, 73-R, 225-R, 375-R, 403-R
defects, 296-S
economic outlook, 277-A
flaking, 109-L
properties, 630-L
surface roughness, 518-L
uniformity of coat, 712-L
Galvanizing, 57-L, 71-L, 100-L, 239-L, 240-L, 471-L, 551-L
aluminum in bath, 556-L
bath protection, 228-L
centrifuging, 538-L
conveyor systems, 329-L
deterioration of base metal, 274-R, 275-R, 366-R
electric heating, 156-L
electrogalvanizing, 279-L
gas-fired furnace, 598-L
kinetics of, 363-L
oil-fired furnace, 152-L
wet vs. dry, 120-L
zinc recovery, 135-L

Galvanizing plants, 333-L
Gamma radiography, 7-S, 54-S, 139-S, 301-S, 385-S
  equipment, 261-S, 366-S
  exposure time, 115-S
  sources, 425-P, 295-S
  x-rays compared, 66-S
Gamma rays, 153-P, 425-P, 451-P
  emitted in neutron capture, 86-P, 87-P
Gas (natural)
    See also under specific types of furnaces and operations.
  corrosive action, 162-R, 227-R, 390-R.
Gas heating equipment, 69-B, 70-F. See also under specific furnace types
Gas pipes
  cathodic protection, 176-R, 262-R, 287-R
  corrosion, 61-R, 69-R, 266-R
  stresses in, 920-Q
Gas plating. See Vapor deposited coatings
Gas turbines, 61-T
  blades, 82-T
    creep tests, 348-Q, 441-Q
    inspection, 229-S
    oxidation, 17-S
    stress-corrosion, 145-R
    vibration, 604-Q
  heat resistant alloys for, 217-T, 308-T, 313-T
    properties, 35-Q, 73-Q, 76-Q, 123-Q, 852-Q, 862-Q, 904-Q
  rotor discs, 274-G, 418-Q, 514-Q, 738-Q, 771-Q
  starters, die-cast, 500-E
  stresses in, 593-Q, 598-Q
  stretch-formed parts, 212-G
  surface finishes, 361-L
  uses, 361-T
  welding, 94-K
  welds, inspection, 150-S
Gases
  purification, 201-K
  sampling, 110-S
Gases in metals, 122-E, 58-N, 73-N, 147-N.
    See also specific gases
  aluminum alloys, 263-E
  analysis, 146-S, 180-S
  cast iron, 379-D, 645-E, 646-E, 461-L, 73-N
  castings, 117-E, 570-E
  effect on bond stability, 238-N
  sorption, 307-P, 408-P
    copper, 128-P, 313-P
    iron, 342-P, 343-P
    molybdenum, 110-P
    thoriun., 40-H
Gear cutting machines, 77-G, 189-G
Gears, 83-T
  casting, 320-E, 461-E, 620-E
  deburring, 687-L
  failure, 885-Q
  grinding, 206-G
  heat treatment, 1-J, 150-J, 181-J, 185-J, 198-J
  impact strength, 844-Q
  induction hardening, 6-J, 7-J, 150-J
  inspection, 10-S
  lubrication, 91-S
  manufacture, 2-A, 163-A, 121-E
  metal powder, 57-H
  stresses, 87-Q, 156-Q, 600-Q
  wear, 67-Q, 1022-Q, 1040-Q
Geiger counters, 107-M, 318-P
Germanium, 471-P, 65-S. See also Transistors.
  carrier recombination rate, 248-P
  conduction, thermal conversion, 142-P, 459-P, 461-P, 491-P
  crystal structure, 89-M, 114-M
  diffusion in, 47-P
  dislocations in, 179-M
  elasticity, 300-Q
  electric resistance, 279-P, 481-P, 465-Q
  electron and hole mobility, 47-P, 185-P, 232-P, 359-P, 360-P, 361-P, 414-P, 471-P
  electron collisions, 143-P
  etching, 114-M
  evaporation, 143-N
  grain boundary resistance, 3-P
  Hall effect, 107-P, 279-P, 481-P
  in coal, 129-T, 3-V
  in tin, 100-N
  indium in, 43-N
  infrared absorption, 245-P, 500-P
  injected absorption, 416-P
  isotopes, 271-S
  magnetic effects, 350-P
  optical properties, 374-P
  photomagneto-electric effect, 284-P, 492-P
  plastic deformation, 468-P, 465-Q
  plasticity, 8-Q, 9-Q
  radiative transitions, 239-P
  review, 91-C, 10-V, 64-V, 102-V
  single crystals, 189-N, 216-P, 374-P, 461-P
  solubility of metals in, 153-N, 189-N, 216-P
  specific heat, 501-P
  surface conductivity, 79-P, 458-P, 460-P
  surface tension, 457-P

Germanium (cont.)
thermal expansion, 300-Q
thermal properties, 411-P
ultrasonic attenuation, 231-P
Germanium alloys, 428-M
Germany
foundry industry, 358-E, 412-E
metal industry, 34-A, 265-A, 267-A, 271-A
nonferrous metal industry, 150-A, 216-A, 262-A, 263-A, 270-A
steel industry, 229-A, 255-A, 286-A, 24-D
welding industry, 151-K
Glass, 136-T
coatings on steel, 143-L, 401-R
joining-to-metals, 235-K, 592-K, 558-L, 122-V
Glycols
corrosive action, 182-R, 375-R
Gold
anelasticity, 566-Q
electric resistance, 141-P
electrode potential, 9-R
grain boundary energy, 84-P
isotopes, 226-P, 237-P, 388-P
neutron cross section, 323-P
optical properties, 73-P
review, 33-V
surface properties, 109-P
thermal conductivity, 375-P
thermionic constants, 341-P
Gold alloys, 85-V
chemical properties, 488-P
corrosion resistance, 163-R
mechanical properties, 70-Q
working, 325-T
Gold extraction and refining, 164-B
cyanidation, 33-B, 34-B, 64-B, 76-C, 88-C
recovery by ion-exchange, 3-A, 12-A, 281-A, 80-C
smelting, 40-C
Gold industry, 168-A
Gold-iron alloys, 95-P
Gold-manganese alloys, 373-M
Gold ores
concentration, 38-B, 39-B, 40-B, 94-B, 114-B, 165-B
crushing, 186-B
sampling, 166-B
sulfide concentrate, 113-B
Gold plating, 19-L, 82-L, 295-L, 296-L, 298-L, 431-L, 547-L
Gold-platinum alloys, 5-M
Gold-silver alloys, 163-P
Goniometers, 272-M, 290-M
Grain growth, 87-M, 429-M, 432-M, 76-N, 276-N. See also Crystals; Nucleation and under specific metals
Grain size, 29-M, 148-M. See also under specific metals
Graphite, 44-G. See also Carbon
anodes for cathodic protection, 4-R, 372-R
induction furnace, 225-J
molds, 232-E
uranium lattice, 111-M
Great Britian
aluminum industry, 202-A
cast steel foundry practice, 262-E
corrosion research, 257-R
metal industry, 44-A, 80-A, 167-A, 264-A, 268-A
tin industry, 172-A
Grinding, 55-G, 58-G, 112-G, 205-G, 238-G, 299-G, 385-G, 387-G. See also Abrasives; Ball mills; Honing; Polishing; Tumbling; and under specific metals and products
abrasive belt, 20-G, 25-G, 75-G, 81-G, 125-G, 254-G
centerless, 15-G
coolants, 92-G, 234-G
cylindrical, 247-G
dictionary, 61-G
dust control, 45-G, 96-G, 406-G
electrolytic, 177-G, 240-G, 245-G
lubrication, 234-G
surface, 229-G
vibration, 183-G
wear test, 778-Q
Grinding wheels, 86-G, 156-G, 238-G, 319-L
diamond, 245-G, 263-G
Guided missiles, 333-T
Gun barrels,
plating, 498-L, 707-L
Gun metal, 76-E
Hafnium, 4-V, 67-V
hydrogen in, 4-M
isotopes, 211-P, 271-S
metallography, 222-M, 239-M
Hafnium dioxide
specific heat, 119-P
Hafnium extraction and refining, 68-C
Hafnium tetrachloride
specific heat, 119-P
Hall effect, 68-P, 107-P, 383-P, 502-P. See also under specific metals
electron inertia, 4-P
low temperature, 29-P, 45-P
magnetic field effects, 72-P, 200-P
measurement of, 402-P

Hall effect (cont.)
relation to resistivity, 29-P, 49-P
Hardenability, 55-J, 140-K, 313-Q. See also under specific metals.
Hard facing. See Weld-deposited coatings.
Hardness and hardness testing, 19-J, 117-Q, 466-Q, 495-Q, 767-Q. See also under specific metals and products.
anisotropy, 775-Q
definitions, 313-Q
effect of electrolytic polishing, 108-Q
low-load, 401-Q
micro-, 92-H, 42-Q, 48-Q, 492-Q
relation to
chemical bond, 430-P
flow, 811-Q
load, 389-Q, 436-Q
wear, 919-Q
review, 848-Q
Rockwell, 1002-Q, 1003-Q
specimen thickness, 1002-Q
standards, 858-Q
temperature coefficient, 768-Q
theory of, 320-Q
Heading, 16-G, 50-G, 103-G, 106-G, 129-G, 258-G, 35-H
Heat exchangers,
aluminum, 318-G, 260-K
corrosion, 185-R, 305-R
Heat resistant alloys, 44-T, 12-V. See also under Gas turbines; specific heat resistant alloys; and under specific metals.
books, 654-Q, 34-V
castings, 582-E, 359-T
corrosion (oxidation), 80-R, 222-R, 417-R
creep, 646-Q
drawing, 252-F
failure, 541-Q
electric melting, 61-C
effect of alloy additions, 277-S
forging, 146-G
heat resistance diagrams, 436-P, 161-T
mechanical properties, 38-Q, 68-Q, 224-Q, 892-Q, 1007-Q
metal powder, 107-H
microhardness, 32-Q
protective coatings, 495-L, 222-R
recovery, 267-N
recrystallization, 267-N
review, 915-Q, 27-V
selection, 440-Q, 356-T
stress-rupture, 4-Q
structure, 316-M
surface examination, 397-M
use in electric furnace, 236-Q, 232-T
Heat resistant alloys (cont.)
welding, 44-K, 206-K, 608-K, 612-K, 619-K, 672-K
Heat transfer, 169-E, 126-P, 168-P. See also Heat exchangers; and under specific metals and products
Heat treatment, 34-J, 109-J, 134-J. See also specific heat treating processes, and under specific metals and products.
batch, 240-J
books, 141-J, 166-J, 194-J, 272-J
controlled atmospheres, 40-J
distortion in, 42-J
effect on transition temperature, 992-Q
equipment, review, 73-J, 168-J
fire hazards, 236-J
materials handling, 113-F, 107-J, 135-T
ratio delay, 35-J
review, 4-J, 78-J, 86-J
Heat treatment furnaces, 50-J, 94-J, 118-J, 133-J, 155-J. See also specific heat treating furnaces, e.g., Annealing furnaces.
doors, counterbalancing, 108-J
double-end batch, 145-J
electric, 48-J, 188-J
gas-fired, 125-J, 195-J, 243-J
instrumentation and control, 99-F, 148-J, 252-J, 148-S
linings, 245-J
pusher-type, 250-J
review, 146-J, 147-J, 173-J
rotary hearth, 157-J, 211-J, 251-J
Heat treatment plants, 54-J, 68-J, 126-J, 159-J, 215-J, 261-J, 239-S
Heating equipment See specific types, e.g., Radiant heating
Heats of formation, 167-P, 496-P
Heavy-media separation, 176-B, 225-B. See also under specific ores.
Heavy metals, 220-M. See also specific heavy metals.
Helicopters, 458-Q
Hobbing. See Milling and hobbing.
Honing, 235-G, 256-G, 309-G
Horticulture, 218-T
Hungary,
ferro-alloy production, 167-B
nodular iron research, 484-E, 575-E, 627-E
Hydrochloric acid,
corrosive action,
aluminum, 215-R
precious metals, 163-R
stainless steel, 149-R
tantalum-zirconium, 158-R, 159-R
Hydrofluoric acid, 568-L

Hydrogen,
determination, 240-S
dissociation on tungsten, 54-N
effect on graphitization, 70-N
in aluminum, 180-J, 37-N
in brass, 317-R
in hafnium, 4-M
in iron, 459-L, 190-M, 51-N, 70-N, 73-N, 295-N, 75-P, 342-P, 343-P
in palladium, 52-N
in steel, 117-D, 277-D, 293-R
determination, 277-D, 35-S, 60-S, 290-S
diffusion, 133-N, 229-N, 301-N
effect on deformation, 62-Q, 182-Q
effect on tensile strength, 230-Q
embrittlement. See Steel, embrittlement.
removal, 53-P
sources of, 729-L
in uranium, 57-M
in welding electrodes. See Electrodes, welding.
in zirconium, 963-Q, 240-S
overvoltage, 174-L
permeation through metals, 52-N, 65-N, 213-N
solubility in metals, 213-N
Hydrogen peroxide, 148-P
Hydrogen sulfide
corrosive action, 66-R, 145-R
Hydrogen ion concentration, 26-B, 341-L
Hydrometallurgy, 29-B, 80-B. See also under specific metal ores.
Impact testing, 589-Q, 861-Q, 1041-Q. See also under specific metals and products.
constant temperature, 519-Q
deflection gage, 588-Q
hot-tensile, 614-Q
plastic deformation, 94-Q
relation to heat treatment, 357-Q
reproducibility, 124-Q
specimen geometry, 376-Q
strain wave propagation, 594-Q
India
electrometallurgy, 122-C
foundry industry, 115-E
metal industry, 18-A
metallurgy, 35-A
precious metal industry, 363-T
steel industry, 147-B
Indium, 10-T
in germanium, 43-N
isotopes, 153-P, 249-P, 270-P
metal solubility in, 153-N
resonance scattering, 364-P
solubility in copper, 234-M
Indium (cont.)
solubility in mercury, 276-P
specific heat, 337-P
superconductivity, 431-P
Indium-alkali metal alloys, 336-M, 467-P
Indium amalgams, 254-P, 276-P
Indium-antimony alloys, 98-M
electric properties, 273-P, 506-P, 507-P
magnetoresistance, 233-P
Indium-arsenic alloys, 98-M
Indium-copper-silver alloys, 41-M
Indium extraction and refining, 44-C, 46-C
Indium-manganese alloys, 312-M
Indium-silicon alloys, 153-N
Indium-tellurium alloys, 336-M
Indium-thallium alloys,
electric resistance, 2-P
superconductivity, 1-P
Indium-zinc alloys, 219-P
Indonesia,
tin industry, 200-A
Induction heating, 71-J, 85-J, 169-J, 177-J, 237-J, 90-P. See also Dielectric heating; Electric furnace, induction; and under specific metals and products
dual frequency, 84-J, 95-J
hardening, 33-J, 57-J, 63-J, 140-J, 150-J, 167-J, 185-J
high frequency, 128-J
low frequency, 57-F, 186-J
medium frequency, 140-C, 88-E
stress-relief, 242-J
temperature control, 172-S, 273-S
temperature gradients, 160-P
Induction welding, 675-K
Industrial relations, 69-A, 70-A
Inert arc welding, 150-K, 164-K, 237-K, 346-K, 359-K, 362-K, 517-K, 527-K, 602-K, 700-K. See also under specific metals and products.
arc characteristics, 229-K, 120-P
electrodes, 572-K
thoriated, 183-K
gas flow, 272-K
gas formation, 344-K
gas shields, properties, 526-K, 655-K
equipment, 383-K, 573-K
metal transfer, 68-K
semi-automatic, 10-K
voltage, 175-K
Infrared rays, 338-E
drying equipment, 75-L, 86-L, 130-L, 605-L, 54-T
radiation damage to eyes, 201-A
radiation measurement, 236-S
Ingots. See also Steel ingots; Continuous casting.

Ingots (cont.)
casting, 47-C, 100-C, 240-D
gas content, 570-E
molds, 255-D, 268-D, 35-T
preheating, 216-F
solidification, 67-N
temperature of mold-metal interface, 270-S
Inspection, 188-G, 2-S, 5-S, 37-S, 113-S, 151-S, 252-S, 319-S. See also Gages; specific inspection processes and under specific metals and products.
Institute of British Foundrymen
Proceedings, 279-E
Instruments, 202-S, 387-S, 346-T. See also specific instruments.
aluminum, 252-G, 347-T
cast parts, 251-E
electric, 123-S, 355-S, 406-S
materials selection, 130-T
Interferometry, 220-S, 337-S, 339-T
Intermetallic compounds, 390-M. See also specific alloy systems.
crystal chemistry of, 293-M
interstitial atoms, 382-M
phase structures, 336-M
semiconducting, 273-P, 349-P, 467-P, 507-P
theory of, 325-M
International Committee of Electrochemical Thermodynamics and Kinetics, 183-L
Internal friction. See Anelasticity
Iodine
corrosive action, 348-R
Ion exchangers, 51-A, 85-C
chromate recovery by, 49-A, 50-A, 55-A, 247-L, 399-L, 623-L
gold recovery, 3-A, 12-A, 281-A, 80-C
metal recovery, 28-A, 248-A
rare earth separation, 167-S
Iridium isotopes, 31-S
Iron
abrasion, 856-Q
allotropic transformations, 20-N
aluminum inclusions, 39-M
anelasticity, 1031-Q
brittleness, 82-Q
-carbon diagram, 7-M, 143-M, 190-M, 73-N, 127-P
corrosion,
acid, 175-R
aqueous, 83-R
inhibitors, 174-R, 194-R
nitric acid, 443-R, 473-R
stress-, 113-Q
sulfuric, 10-R, 138-R
zinc, molten, 274-R, 275-R, 366-R
Iron (cont.)
determination, 2-M, 111-S, 193-S
diffusion, 158-N, 272-N, 313-N, 123-P
domain structure, 39-P
electrode potential, 75-P, 118-P
electrolytic polishing, 218-L
fatigue, 747-Q
fracture, 113-Q
gas absorption, 73-N, 342-P, 343-P
Hall effect, 72-P, 383-P
hydrogen in. See Hydrogen
in aluminum, 156-N
in brass, 2-M
magnetic properties, 20-N, 91-P, 345-P, 381-P, 58-S
magnetic saturation, 155-P
metal solubilities in, 15-N
Neumann bands, 372-Q
oxidation, scaling, 218-L, 67-M, 323-M, 84-R, 136-R, 216-R
oxygen in. See Oxygen.
passivation, 11-R, 107-R, 108-R, 113-R, 235-R, 236-R, 490-R
plastic deformation, 139-M, 141-M, 165-Q, 777-Q, 901-Q, 1029-Q
precipitation, 225-N
properties, 6-V
protective coatings, 321-L
reaction with aluminum, 170-N
recrystallization, 47-N, 244-N
tensile properties, 972-Q
torsion texture, 99-C
transition temperature, 61-Q
yield, 84-Q, 163-Q, 1032-Q
Iron alloys,
analysis, 157-S
embrittlement, 366-Q
machinability, 325-G
separation, magnetic, 58-S
rigidity modulus, 55-P, 107-Q
tempering, 366-Q
theory of formation, 8-N
thermal expansion, 55-P
Iron-aluminum alloys, 580-E, 15-P
Iron borides, 387-M
Iron carbides, 92-H, 259-M, 241-N, 407-P. See also Austenite; Bainite; Ferrite; Martensite; Pearlite
Iron-chromium alloys, 193-N, 892-Q, 301-R
Iron-chromium-aluminum alloys, 68-Q
Iron-chromium-molybdenum alloys, 388-M
Iron-chromium-nickel alloys, 386-R
Iron-cobalt-sulfur alloys, 247-M
Iron extraction and refining, 120-D, 194-D, 217-D, 251-D, 261-D. See also specific processes, e.g., Blast furnace practice; Sponge iron

Iron extraction and refining (cont.)
direct reduction, 80-B, 86-C, 54-D, 118-D, 199-D, 264-D, 316-D, 317-D, 324-D, 325-D
electrolytic reduction, 100-D
gas-solid reactions, 121-D
slag-metal reactions, 193-D
Iron-manganese alloys, 18-M, 221-M
Iron, molten. See also Steel, molten.
aluminum-oxygen equilibrium, 56-N
carbon equilibrium, 127-P
electric resistance, 412-P
metalloids in, 208-N
silicon-oxygen equilibrium, 410-P
surface tension, 426-P
Iron-molybdenum alloys, 18-N
Iron-nickel alloys,
activity of iron in, 421-P
irreversibility, 197-N, 198-N
magnetic properties, 102-P
nucleation, 197-N
superlattice formation, 84-N
surface study, 330-M
Iron-nickel powders, 16-H
Iron ores, 21-A, 106-B, 126-B, 148-B, 181-B. See also Magnetite; Taconite
adsorption on, 99-P
analysis, 65-B, 192-S
Birmingham, Ala. 202-B
Brazilian, 161-B
concentration, 50-B, 83-B, 109-B
cyclone separator, 81-B, 178-B
jigging, 163-B
magnetic classifier, 68-B
reducing magnetization, 213-B
crushing, 131-B
crystal structure, 31-M
flotation, 51-B
Labrador, 2-B
Lake Superior, 47-B, 217-B
Liberian, 177-D
Morrocan, 178-D
porosity, 223-B
Quebec, 2-B
reduction tests, 15-B, 353-D
roasting, 151-B
sintering and nodulizing, 27-B, 28-B, 66-B, 98-B, 101-B, 129-B, 130-B, 169-B, 180-B, 221-B
sizing, 102-B
tramp metal detector, 73-S
Iron oxides, 323-M, 216-R. See also Iron, oxidation, scaling
activity, 103-D
diffusion in, 158-N
silicate system, 216-B, 103-D
Iron phosphate, 11-R
Iron phosphides, 131-E, 307-M, 399-M
Iron-phosphorus alloys, 160-B
Iron plating, 549-L
Iron-platinum alloys
electric resistance, 438-P
Iron powders, 73-H
alloying, copper, 33-H, 75-H
cadmium plating, 680-L
density, 122-H
impregnation, 42-H
magnetic properties, 62-H, 77-H, 82-H
production methods, 16-H, 18-H, 43-H
sintering, 8-H, 44-H, 75-H
Iron-silicon alloys, 7-M
domain patterns, 39-P, 199-P, 464-P
grain orientation, 242-P
single crystals, 347-M, 394-M
structure, 65-M, 394-M
Iron-silicon brass, 494-Q
Iron sulfide, 247-M, 99-P
Iron-titanium alloys, 208-J
Iron-vanadium alloys, 421-E, 282-N
Iron-zinc alloys, 307-M
Isotopes, table, 331-P. See also under specific elements
Italy
metal industry, 43-A
Jamaica
aluminum deposits, 128-B
Japan
aluminum industry, 4-A
electroplating industry, 308-L
metal industry, 46-A
substitute steels, 9-V
x-ray inspection equipment, 98-S
Jet propulsion engines, 458-Q. See also Gas turbines
ceramic-coated parts, 145-L, 242-L, 483-L
fabrication, 31-G, 320-G
finishing, 588-L
fuel nozzle corrosion, 196-R
machining, 258-G
stress-relief heat treatment, 27-J
supersonic inspection, 281-S
welding, 70-K, 92-K, 114-K, 164-K
Jewelry, 393-E
Jigs and fixtures, 401-G
Joints, 9-K. See also Bolts and nuts; Rivets and riveting; Adhesives
bellows-type, 295-K
electric resistance, 275-L
fatigue strength, 11-Q, 829-Q, 995-Q
glued, 391-K, 829-Q, 995-Q
Labrador
iron ores, 2-B
Lacquers and lacquering, 92-L, 103-L, 488-L

Ladders, 237-T
Ladles, hot metal, 212-D
Lamps, finishing, 93-L
Lanthanum
  crystal structure, 113-M
  heat of combustion, 400-P
Lathes, See Turning
Latin America,
  steel industry, 287-A, 290-A, 291-A, 292-A, 294-A, 296-A, 297-A, 306-A, 327-D
Lead,
  cathodic disintegration, 157-P
  creep, 363-Q
  determination, 176-L
  in copper alloys, 69-N
  isotopes, 344-P
  sodium compounds, 294-M
  specific heat, 23-P
  yield stress, 795-Q
Lead alloys, 5-V. See also Babbit metal.
  composition and properties, 283-T, 291-T
  corrosion, 51-R, 60-R, 456-R, 183-T, 303-T
  creep, 387-Q, 507-Q, 509-Q, 623-Q, 882-Q
  electrolytic polishing, 325-L
  failure, 288-K, 623-Q
  fatigue, 387-Q
  plumbing equipment, 110-K
  printing metal, 294-T
  sampling, 95-S
  standards, 49-V
Lead-antimony alloys, 42-M, 34-N, 51-R
Lead-bismuth alloys, 218-M, 454-P
Lead bronze, 22-E, 197-T
Lead-calcium alloys, 175-C
Lead cyanamide coatings, 394-L, 530-L, 141-R
Lead die castings, 454-E, 560-E
Lead extraction and refining, 136-B, 133-C, 143-C, 175-C
  cyanidation, 177-C
  desilvering, 37-C, 123-C
  electrorefining, 34-C
  smelting, 7-C, 99-C, 102-C, 130-C, 134-C
    Harris process, 22-C, 23-C, 124-C
Lead industry, 79-A, 173-A, 113-V
  future requirements, 143-A
  import tax, 165-A
  production statistics, 153-A, 232-A
Lead ores, 285-A
  Australia, 37-B
  concentration, 46-B, 73-B, 84-B
  flotation, 23-B, 35-B, 123-B, 197-B
  milling, 59-B, 95-B
  sintering, 57-B
Lead plate,
  bending-fatigue, 508-Q
Lead plating, 66-L, 365-L, 591-L
  bath analysis, 176-L
Lead-silver-sulfur alloys, 219-M
Lead sulfide
  oxidation, 84-B
  photoelectric effects, 305-P
Lead-tin plating, 365-L
Lead-zinc alloys, 422-M, 37-P
Leak detectors, 223-S
Light metals, 220-J. See also Aluminum alloys; Magnesium alloys; Titanium alloys
  bending stress, 808-Q
  castings, 241-S
  extrusion, 43-T
  fatigue, 241-Q
  forging, 105-F, 245-F, 43-T
  history of, 116-A
  in underwater equipment, 254-T
  joining, 42-K
  painting, 430-L, 679-L, 730-L
  pressing, 391-G
  properties, 355-T
  riveting, 523-K
  welding, 122-K, 527-K, 649-K
Limestone, 198-B
Liquid-solid reactions. See Solid-liquid reactions
Lithium, 59-P, 16-V
  isotopes, 174-P
  light absorption, 147-P
  lubricants, 68-F, 163-G
  specific heat, 223-N
Lithium chloride
  heat of formation, 77-P
Lithium fluoride, 104-M
Lithium-magnesium alloys, 253-M
Lithium ores
  concentration, 55-B, 196-B
Lithography, 709-L
  plates, 211-T
    aluminum-copper, 46-T, 192-T
    magnesium, 132-T
Locomotives
  cast parts, 271-E
  welding, 143-K, 543-K
Lubricants and lubrication, 68-F, 74-F, 219-Q, 1009-Q. See also Drawing (metal); Friction; Wire drawing, cutting fluids
  corrosive action, 13-R, 211-R
Machinability, 153-G, 395-G. See also under specific metals
Machine shop practice, 305-A
Machine tools. See also specific tools and machining processes, e.g., Milling and hobbing.

Machine tools (cont.)
automatic transfer, 409-G
bedways, 17-J
investment cast parts, 330-E
materials for, 89-G, 182-G, 64-T
painting, 369-L, 446-L
stresses, 60-Q
surface hardening, 17-J, 152-J, 201-J
welded frames, 456-K, 510-K
welding, 688-K
Machining, 128-G, 185-G, 287-G, 324-G, 378-G. See also specific machining processes and under specific metals and products.
chatter, 303-G
coolants, 173-G
electrolytic, 241-G, 250-G, 251-G, 134-Q
electrosparking and arcing, 29-G, 241-G, 243-G, 250-G, 251-G, 312-G, 405-G
energy in, 260-G
friction cutting, 67-G
inspection, 188-G
layouts, 267-G
plastic deformation in, 21-G, 68-G
powder processes, 294-G
pre-spin testing, 238-S
research, 237-G
single-point tools, 143-G
speeds and feeds, 76-G, 182-G, 209-G, 210-G, 218-G
stresses in, 262-S
supersonic vibrator, 29-G, 157-G
temperatures in, 280-G, 315-G
"Theory and practice," 47-G, 115-G, 205-G, 259-G
tool wear, 60-G, 315-G
Magnesium, 176-A, 96-T
alloying characteristics, 407-M
anodes for cathodic protection, 2-R, 246-R
creep, 406-Q, 889-Q
crystal structure, 407-M
electron energy levels, 46-P
in cast iron. See Cast iron, nodular.
isotopes, 246-P, 250-P, 252-P, 274-P, 403-P, 505-P
plastic deformation, 80-Q
proton capture, 184-P
safe handling, 313-A
separation from sodium isotopes, 184-S
vapor pressure, 348-P
Magnesium alloys, 170-P, 473-Q, 2-T, 123-T, 285-T
anodizing, 211-L
clad, 101-R
compressive stress, 498-Q
corrosion, 42-R, 364-R, 406-R, 433-R, 477-R
Magnesium alloys (cont.)
creep, 819-Q
drawing, 155-G
electric conductivity, 499-P
electrolytic polishing, 155-L, 475-L
electroplating on, 306-L
extrusion, 126-F, 383-G
finishing, 18-L, 107-L
forging, 53-F, 151-F, 217-F, 242-F
grinding, 52-G
Hall effect, 499-P
hardness, 475-Q
heat treatment, 110-J, 111-J
high-temperature behavior, 28-Q, 262-Q, 459-Q
impact testing, 951-Q
in aircraft, 47-E, 220-E, 517-Q, 7-T, 26-T, 293-T
in automobiles, 15-T, 59-T, 76-T
in cranes and hoists, 256-T
in lithographic plates, 132-T
in materials handling equipment, 92-T, 95-T, 155-T, 256-T
in truck wheels, 9-T
machinability, 262-G
painting, 18-L, 128-L, 437-R
plastic deformation, 349-Q, 785-Q, 889-Q
polishing, 475-L
presswork, 251-G, 386-G
protective coatings, 73-L, 117-L, 555-L, 609-L, 363-R
rolling, 223-F, 349-Q
soldering, 135-K
specifications, 145-S, 349-S
stresses in, 37-Q
wear resistance, 55-L, 336-T
welding, 116-K, 197-K, 209-K, 307-K, 450-K
Magnesium-cadmium alloys, 334-P, 354-P
Magnesium carbides, 430-M
Magnesium castings, 47-E, 220-E, 7-T
impregnants for, 562-E
fluoroscopic inspection, 196-S
specifications, 237-E, 234-S
strength, 564-E
x-ray inspection, 303-S
Magnesium-cerium alloys, 133-Q
Magnesium-copper-nickel alloys, 53-M
Magnesium-copper-zinc alloys, 53-M
Magnesium die casting practice, 473-E
Magnesium extraction and refining, 17-C, 19-C, 39-C, 112-C, 128-C, 173-C
Magnesium ferrite, 243-M
Magnesium foundries, 16-E
Magnesium foundry practice, 12-E, 192-E, 211-E, 234-E, 306-E
grain refinement, 46-E, 264-E
permanent mold, 302-E

Magnesium foundry practice (cont.)
precision casting, 48-E
quality control, 172-E
shell molding, 49-E, 99-E, 295-E
Magnesium-lead alloys, 76-P
Magnesium-lithium alloys, 91-M
Magnesium-nickel-zinc alloys, 53-M
Magnesium oxides
thermal conductivity, 126-H
Magnesium powders, 111-H
Magnesium sheet and plate, 156-C, 65-F, 152-F, 13-G, 54-G
Magnesium-silicon-copper alloys, 291-M
Magnezium-zinc-zirconium alloys, 207-Q
Magnesium-zirconium alloys, 525-E, 302-Q, 451-Q, 565-Q, 35-V
Magnetic core materials, 12-H, 18-H, 131-P, 379-P, 513-P, 51-T
Magnetic materials, 62-P, 179-P, 120-T, 260-T
heat treatment, 36-J, 181-P
high-frequency calibration, 40-P
permeability, 40-P
temperature sensitivity, 352-P
Magnetic properties, magnetism, 256-P, 424-P. See also under specific metals.
antiferromagnetism, 145-P, 215-P, 229-P, 382-P
Barkhausen effect, 462-P
coercive force, 204-P
Curie temperature, 94-P
domain theory and structure, 172-P, 418-P, 462-P
fields and field effects, 89-P, 201-P, 295-P, 419-P, 438-P, 450-P
low temperature, 94-P, 439-P
magnetization curves, 78-P, 188-P, 418-P, 450-P
magnetoresistance, 439-P
magnetostriction, 15-P, 28-P, 71-P, 116-P
measurements, 130-P, 427-P
paramagnetism, 95-P, 112-P
permeability, 16-P
phase transitions, 229-P
relaxation, 112-P
specific heat, discontinuity, 382-P
spontaneous magnetization, 189-P
susceptibility, 89-P, 95-P, 195-P, 201-P
theory of, 172-P
Magnetic flaw detection, 27-S, 51-S, 58-S, 207-S, 208-S, 279-S, 302-S, 406-S
magnetic flux, 340-S
magnetic particles, 15-S, 77-S, 100-S, 408-S
Magnets, permanent, 303-P, 397-P, 448-P, 53-V
Magnets, permanent
coercive force, 80-H, 486-P
heat treatment, 180-P
magnetization, 395-P
manufacture, 17-G
microstructure, 146-M
orientation, 102-N
oxides, 347-P
powder metal, 31-H, 62-H, 80-H, 6-P, 205-P, 486-P
Magnetite
concentration, 68-B, 200-B
formation in copper smelting, 3-C
oxidation, 193-B
sedimentation analysis, 41-B
sintering, 22-B
Malleable iron, 103-E, 273-E, 354-E, 566-E, 44-V
annealing, 20-J, 121-J, 234-J
boron in, 252-E
graphitization, 148-N, 208-Q
flame hardening, 96-J
melting, 239-D, 281-E, 647-E
molding, 166-E
pearlite in, 134-N, 256-S
peeling, 123-S
quality control, 81-S
research, 219-E
specifications, 523-E
tensile strength, 782-Q
welding, 83-K, 394-K
Malleable iron foundries, 26-E
mechanization, 184-E
Manganese, 182-A, 364-T
conservation, 155-D
diffusion in steel, 78-N
energy levels, 46-P
in aluminum, 22-N
in weld metal, 492-K, 772-Q
isotopes, 156-P
nuclear hyperfine structure, 244-M
structure of gamma, 216-M
Manganese-aluminum alloys, 257-M
Manganese bismuthide, 6-P, 205-P
Manganese brass, 31-R
Manganese bronze,
casting, 3-E
Manganese diffusion coatings, 78-N
Manganese extraction and refining, 6-B, 15-C, 158-D
recovery from slags, 120-A, 12-D, 186-D, 187-D
Manganese-indium alloys, 312-M
Manganese ores, 31-A, 314-A
concentration, 14-B, 75-B, 85-B, 149-B, 201-B
flotation, 157-B

Manganese ores (cont.)
leaching, 11-B, 44-B, 86-B, 139-B
sizing, 135-B
Manganese-silicon steel, 98-J
Manganese steel, 91-V
corrosion resistance, 109-T, 38-V
embrittlement, 513-Q, 966-Q
fatigue, 833-Q
grain size, 96-M
grinding, stresses, 619-Q
impact strength, 513-Q
nucleation, 106-N
stress-strain curve, 974-Q
substitute for stainless, 973-Q, 38-V
tensile strength, 513-Q
weldability, 214-K, 694-K
welding, 509-K
Manganese-tellurium alloys, 246-M, 261-M, 363-M
Marine turbines, 138-K, 70-R
Martensite,
crystal structure, 369-M, 415-M, 59-N, 89-N
lattice distortion, 19-M
nucleus energy, 190-N
screw dislocations, 616-Q
tempering, 266-N
x-ray line-broadening, 109-M
Martensite reaction, 35-N, 217-N, 302-N
conversion temperature, 146-N, 194-N, 403-Q
decomposition, 44-N
effects of deformation, 105-N
effects of heat treatment, 6-N, 289-N
effects of stress, 163-N, 309-N
formation rate, 131-N, 258-N
kinetics of, 81-N
nucleation, 90-N, 163-N, 186-N
Massachusetts Institute of Technology
metallurgy department, 9-A, 10-A
Materials, 65-A, 220-A, 71-Q, 830-Q, 4-T, 68-T. See also specific materials and metals.
conservation, 11-A, 196-A, 227-A
design properties, 981-Q
mechanics of, 120-Q, 188-Q, 191-Q, 392-Q, 831-Q
review of new, 310-A, 177-T
strength of, 86-Q, 213-Q, 347-Q, 468-Q
Materials handling, 317-A, 92-T, 95-T, 113-T, 155-T, 256-T. See also specific types of equipment, e.g., Cranes and hoists.
Measurement, 360-S. See also Gages; Instruments, and specific types of measuring equipment.
Mechanics, 120-Q, 188-Q, 191-Q, 392-Q, 831-Q
Mechanical engineering, 110-A
Melting points, measurement, 511-P
Mercury. See also Amalgams.
attack on copper, 269-Q
dendritic growth, 222-N
indium solubility in, 276-P
isotopes, 362-P
metal diffusion in, 240-N
thermoelectric effects, 463-P
vapor viscosity, 138-P
Metal detectors, 73-S
Metal foils, 346-P, 446-P. See also specific metal foils.
Metal industry. See also specific metals and under specific countries.
conservation, 11-A, 15-A, 17-A, 32-A
cost data, 45-L
defense uses, 15-A, 16-A
handbook and directory, 60-A, 64-A, 303-A, 304-A
management of, 89-A, 209-A, 274-A
nonferrous, 93-A, 215-A
ore reserves, 14-A
review, 20-A, 21-A, 22-A, 24-A, 212-A
socialization, 214-A
statistics of, 42-A, 157-A, 275-A
world markets, 269-A
Western U. S., 100-A, 101-A
Metal Powder Association
Proceedings, 119-H
Metal powders, 1-H, 9-H, 20-H, 46-H, 49-H, 60-H, 78-H, 81-H, 85-H, 88-H, 101-H, 103-H. See also Carbides; and specific metal powders and products.
adhesion to base, 91-H
alloy powders, 16-H, 65-H, 69-H, 124-H, 32-M
compacting, 6-H, 19-H
crushing, 76-H, 104-H
density determinations, 28-H
dielectric properties, 61-H
electrolytic production, 87-H
gaging, optical, 209-S
hardness measurement, 22-H
impregnation, 50-H, 74-H, 124-H
machinability, 149-G
milling, 59-H
particle size measurement, 25-H, 34-H, 109-H, 110-H
Plansee seminar papers, 106-H
pore size distribution, 3-H
pyrophoricity, 88-A
quality control, 323-E, 55-H, 66-H
research uses, 21-H
review, 113-H, 114-H
shrinkage, 15-H
sintering, 45-H, 50-H, 93-H, 95-H, 123-H

Metal powders (cont.)
sintering (cont.)
diffusion in, 4-H
liquid phase, 84-H
surface effects, 14-H, 89-H, 94-H
size limits, 52-H
specifications, 109-H
World Congress, 2-H
Metal spraying, metallizing, 307-L, 342-L, 351-L, 372-L, 463-L, 534-L. See also Clad metals; Plastics; Tungsten carbide coatings; Vapor-deposited coatings
books, 398-L, 742-L
corrosion resistance, 22-L, 378-L, 396-L, 420-L, 277-R
effect of fuel gas, 464-L
equipment, 362-L
foundry uses, 154-L
properties of coat, 505-Q
review, 77-L
spray guns, 315-L, 664-L
wire process, 665-L
Metallography, 26-M, 84-M, 188-M, 63-P
color, 409-M
specimen mounting, 332-M
specimen polishing, 105-M, 233-M, 416-M
Metalloids, 208-N, 245-N
Metallurgy, 94-A, 187-A, 193-A, 230-A, 70-B
books, 35-A, 61-A, 62-A, 63-A, 115-A, 158-A, 159-A, 160-A, 244-A, 246-A, 247-A, 318-A, 65-C, 277-M, 31-P, 169-P
Canadian, review, 141-A
dictionary of, 106-A, 249-A
French research center, 104-A
irreversible phenomena, 42-P
Russian texts, 105-A
World Congress, 36-A
Metallurgy, extractive, 260-A, 145-C, 150-C See also specific metal extraction and refining.
chemical processes, 151-A, 12-C, 26-C, 149-C
electric smelting, 159-C
electrolytic processes, 4-C
electromagnetic field, 172-C
intermetallic reactions, 21-C
liquation, 137-C
review, 90-C
Metals, 67-A, 133-A, 226-A, 68-T, 367-T, 88-V, 90-V
coloring, 56-L
electron exchange, 140-P
emissivity, 566-L, 59-P, 428-P, 480-P
literature of, 82-A, 83-A
low temperature behavior, 520-Q, 521-Q, 522-Q, 534-Q, 956-Q
Metals (cont.)
mechanical properties, 950-Q
microstructure, 125-M
neutron cross-sections, 30-M
optical properties, 476-P
physical chemistry of, 255-P
properties, 192-Q, 905-Q
reactions with organic chemicals, 286-P
reflectivity, 48-P, 285-P, 401-P, 441-P
review, 66-A, 48-T
solubility in fused salts, 472-P
sorting, 188-S
structure, 63-P, 508-P
theory of, 384-M, 406-M
Metals, molten. See also Iron, molten; Steel, molten.
component distribution, 451-P
corrosive action, 569-L, 373-Q, 128-R, 151-R, 274-R, 275-R, 366-R
electric resistance, 474-P
flow patterns, 261-E, 508-E
fluidity, 57-E, 304-E, 352-E
gas-metal reactions, 122-E, 58-N
heat transfer, 67-N, 32-P, 336-P
physical chemistry of, 96-B
pumping, 146-A, 206-A, 212-S
sampling, 276-S
surface tension, 139-P, 152-P
temperature measurement, 270-S, 381-S
wettability, 22-P
Meters, 299-S, 276-T. See also Flow meters.
Mexico
coke production, 209-B
steel industry, 299-A
Microscopes and microscopy, 267-M, 276-M. See also X-ray microscopy; Electron microscopy
ASTM techniques, 340-M
hot-stage, 106-M
ore examination, 278-M
particle size measurement, 380-M
surface studies, 47-M, 327-M, 397-M
ultraviolet, 162-M
Milling and hobbing, 290-G, 398-G, 412-G
carbide cutters, 194-E, 51-G, 207-G
punched tape guide, 127-G
surface speed rates, 237-G
temperature of work piece, 51-G, 274-S
Mine roof props, 180-R, 131-T, 142-T
Mirrors, 311-L. See also Metals, reflectivity.
Mishima alloys, 208-P
Mixers (hot metal),
linings, 153-D, 154-D, 204-D
Molybdenum, 183-A, 41-H, 364-T, 67-V
anelasticity, 1031-Q

Molybdenum (cont.)
corrosion
nitric acid, 54-R
diffusion, 200-L, 686-L, 36-N
gas adsorption, 110-P
in stainless steel, 62-N
in steel, 36-N, 187-N
isotopes, 370-P
neutron cross section, 175-P
plastic deformation, 170-Q
properties, 306-Q
recrystallization, 170-Q, 306-Q, 964-Q
specific heat, 479-P
Molybdenum alloys,
clad, 263-R
electroplating on, 628-L
heat resistant, 35-P
recrystallization, 30-H, 250-N
Molybdenum boride, 169-T, 51-V
Molybdenum coatings, 200-L, 686-L, 36-N
Molybdenum-cobalt alloys, 82-M
Molybdenum ores, 8-A
Molybdenum phosphide, 399-M
Molybdenum powders,
recrystallization, 30-H
Molybdenum steel,
carbides in, 159-M, 401-M
conservation, 342-D, 25-T
creep, 130-Q
phosphorus in, 627-Q
properties, 1000-Q
Molybdenum-vanadium steel,
creep, 130-Q
Mond Nickel Company, 38-A
Motion picture photography, 127-E, 112-M
high speed, 261-K, 336-S
Motor coaches and trucks, 18-G, 37-K, 349-K, 9-T
Motorcycles, 156-J
Musical instruments, 211-G, 249-G
Nails, aluminum, 80-T
Neodymium isotopes, 267-P
Netherlands,
metallurgical research, 45-A
Neutrons
absorption in uranium, 212-P
capture gamma rays, 86-P, 87-P
cross sections, 189-M, 183-P
diffraction, 273-M
effect on superlattice formation, 310-N, 311-N
measurement of emitted, 282-P
interaction with mesons, 367-P
interaction with protons, 268-P
scattering, 178-P
thickness measurement by, 179-S
Nevada,
copper ores, 76-B
Nickel,
carbon diffusion in, 24-N
catalytic activity, 306-P
conservation, 155-D, 364-T
deterioration of nucleus, 453-P
effect on steel stabilization, 187-N
Hall effect, 72-P
in copper alloy, 69-N
magnetic properties of thin films, 206-P
magnetic susceptibility, 176-P
magnetostriction, 28-P, 116-P
oxidation, 243-N, 44-R
plastic deformation, 917-Q
resonance, 394-P
rotational relaxation, 197-P
saturation magnetization, 150-P
single crystals
domain structure, 395-M, 396-M
magnetostriction, 116-P
ultrasonic attenuation, 198-P
spin-orbit coupling, 422-P
thermogalvanic potential, 8-R
Nickel alloys, 127-T, 240-T, 32-V, 61-V
anisotropy, 191-P
Barkhausen noise, 192-P
brazing, 90-K
coercive force, 207-P
corrosion, 33-R, 302-R
corrosion resistant, 172-R, 230-R, 268-R, 19-T, 229-T, 59-V, 60-V, 74-V
creep, 172-Q, 227-Q, 441-Q, 971-Q
enameling, 243-L
fabrication, 81-V
heat resistant, 311-A
high temperature equilibrium, 186-M
intermetallic phases, 94-N
machining, 182-G
magnetic permeability, 302-P
magnetostriction, 190-P
microstructure, 269-M
properties, 1050-Q, 22-V, 82-V
stabilization, 168-N
tensile properties, 223-Q
welding, 185-K, 695-K
welding, inert arc, 383-K, 576-K
Nickel aluminides, 186-M
Nickel brass, 90-S
Nickel bronze, 90-S
Nickel carbides, 430-M, 24-N
Nickel-chromium alloys,
corrosion, 252-R
diffusion coatings, 440-L
oxidation, 331-M
precipitation, 334-M, 28-N
properties, 38-D, 68-Q, 41-V
recrystallization, 28-N
working temperatures, 128-M
Nickel-chromium-aluminum alloys, 186-M

Nickel-cobalt powders, 58-H
Nickel-copper alloys, 117-P
Nickel extraction and refining,
smelting, 27-C, 169-C
Nickel foundry practice, 212-E, 413-E
Nickel-gold alloys, 14-P
Nickel hydroxides, 227-M
Nickel industry, 38-A, 179-A, 237-A
Nickel-manganese alloys, 311-P
Nickel-molybdenum-iron alloys, 109-V
Nickel ores,
concentration, 141-B, 233-B
leaching, 8-B
Nickel oxides, 92-M
Nickel plate,
adhesion to base, 67-L, 735-L
corrosion resistance, 285-R
peeling, 254-L
properties, 64-L, 274-L
substitutes for, 3-L, 455-L, 477-L
surface roughness, 627-L, 701-L
Nickel plating, 371-L, 474-L. See also Nickel-tin plating.
baths,
active carbon treatment, 451-L
boric acid determination, 257-L
cyanide-copper, 734-L
impurities in, 83-L
sulfamate, 683-L
sulfurous acid, 102-L
black plating, 402-L
chemical process, 235-L
"electroless", 285-L, 376-L, 612-L
temperature effects, 90-L
waste treatment, 55-A, 229-L
Nickel-platinum alloys,
disordering, 113-N
Nickel powders,
catalytic properties, 71-H
lattice disturbances, 16-H
Nickel-silver, 101-S
elastic properties, 504-Q
electroplating on, 367-L
Nickel steel,
carburizing, 271-J
conservation, 25-T
corrosion, stress, 145-R
machining, 368-G
segregation in, 299-N
thermal stability, 168-N, 224-N
x-ray line broadening, 109-M
Nickel-tin plating, 168-L, 282-L, 293-L, 515-L, 542-L, 575-L, 702-L
23-R
Nickel-titanium alloys, 78-M, 346-M
Nickel-zirconium alloys, 126-M
Nitric acid,
corrosive action, 214-R, 251-R
aluminum, 94-R, 215-R, 488-R
copper, 55-R
iron, 443-R, 473-R, 488-R
molybdenum, 54-R
stainless steel, 332-R
Nitrides,
microhardness, 32-Q
Nitriding, 70-J, 72-J
dimensional changes in, 92-J
effect on bending fatigue, 110-Q
pressure nitriding, 105-J
Nitrogen,
diffusion, 164-P
dissociation, 54-N
effect on titanium oxidation, 147-R
in Bessemer steel, 206-D, 278-D, 335-D 382-D
in cast iron, 200-N
in columbium, 215-N
in iron, 43-M, 51-N, 192-N
in steel, 40-D, 117-D, 246-D, 278-D, 43-M, 227-N, 58-P, 936-Q
in weld metal, 444-K
in zirconium, 75-N
Non-destructive testing, 937-Q, 63-S, 69-S, 75-S, 107-S, 280-S, 287-S, 383-S, 407-S. See also specific test methods, e.g., Radiography.
Normalizing, 189-J. See also under specific metals.
Norway,
metallurgy in, 19-A
Nuclear physics, 289-P
Nuclear reactors, 257-S, 138-T, 274-T
aluminum in, 236-T
Canadian developments, 210-T
French developments, 107-T
design, 137-T
liquid-metal cooling, 278-P, 184-T, 186-T
materials for, 392-R, 87-T, 219-T, 333-T
neutron detectors, 217-S
power generation by, 101-T, 114-T, 187-T, 209-T, 304-T
thermocouple irradiation, 224-S
welded structures, 417-K
zirconium in, 156-T, 176-T, 213-T
Nuclear structure, 118-M, 161-M, 166-M, 167-M
density of nucleus, 241-M
shell model, 88-M, 358-M
Nuclear weapons, 17-G, 279-K, 213-T
Nucleation, 88-N, 90-N, 249-N. See also Crystals, Grain growth; and under specific metals.

Oil, fuel
atomizing, 173-D
openhearth fuel, 56-D, 167-D, 173-D, 236-D, 263-D, 281-D
sulfur content, 169-D
Oil well equipment, 153-T
corrosion, 48-R, 248-R, 266-R, 320-R, 412-R
bacterial, 247-R, 292-R
casings, 413-R, 414-R
drill pipe, 165-R, 166-R, 285-R, 469-R
inhibitors, 15-R, 17-R, 85-R, 86-R, 87-R, 102-R, 160-R, 193-R
storage tanks, 92-R
drill bits, 152-T
drill pipe tests, 20-S, 102-S
sucker rods,
failure, 40-T
heat treatment, 212-J
weld-deposited coatings, 379-L
Oleic acid,
flotation agent, 32-B, 87-B, 170-B
Olivine, 60-E, 138-E, 156-E
Openhearth furnaces. See also Mixers (hot metal).
checker maintenance, 139-D
combustion models, 34-D
control and instrumentation, 119-D, 130-D, 171-D, 172-D, 306-D
design, 145-D, 271-D, 301-D
dust control, 107-A, 222-D
flues, 146-D, 147-D, 222-D
fuels and firing, 44-D
gas-fired, 35-D, 138-D, 174-D, 284-D
mixed fuels, 167-D
oil-fired, 56-D, 173-D, 236-D, 263-D, 281-D
heat loses, 312-D
heating-up, 30-D, 208-D
linings, 83-D, 145-D
acid, 6-D
basic, 126-D, 227-D, 354-D
monolithic, 241-D
rammed, 51-D, 144-D, 149-D, 150-D
wear, 56-D
zebra roofs, 148-D
maintenance and repair, 139-D, 151-D, 152-D, 297-D
slag pockets, 229-D
steam production from, 351-D
uptake dimensions, 175-D, 176-D
water-cooling, 218-D, 349-D, 350-D
Openhearth practice, 5-D, 9-D, 17-D, 213-D, 234-D, 240-D, 283-D, 289-D, 294-D, 338-D. See also Steel, molten.
acid, 332-D, 334-D
charging, 166-D
Openhearth practice (cont.)
charging (cont.)
cold metal, 162-D, 163-D, 164-D, 165-D, 196-D, 365-D
hot metal, 122-D
scrap preparation, 27-D, 37-D, 142-D, 143-D, 343-D
comparison with electric steelmaking, 31-D, 40-D, 68-D, 196-D
oxygen enrichment, 140-D, 141-D, 163-D, 164-D, 292-D, 346-D
pouring, 63-D, 212-D
preheating, 170-D
temperature control, 164-S
training personnel, 135-A, 136-A, 137-A, 138-A, 139-A, 140-A
Openhearth slag, 162-D, 343-D
iron oxide-silicate system, 216-B, 103-D
manganese recovery, 120-A, 12-D, 186-D
oxygen in, 105-D, 309-D
removal by blasting, 242-D
sulfur in, 205-S
Order-disorder. See Superlattice formation.
Ores, 89-B, 156-B, 195-B, 12-C, 26-C. See also names and types of ores, e.g., Iron ores
concentration, 3-B, 54-B, 175-B, 224-B, 24-S
cyclone, 192-B
jigging, 231-B
spiral, 108-B
conservation, 224-A
crushing and grinding, 4-B, 142-B, 143-B, 145-B
cyclone, 135-B, 137-B
rod milling, 185-B
dressing, 248-A, 71-B, 116-B, 119-B, 159-B, 187-B
economic geology, 251-A
handling, 93-B
leaching, 42-B
microscopy, 278-M
roasting, 21-B, 52-B
sampling, 7-B
sintering, nodulizing, 67-B, 110-B
Organic coatings. See Plastics; Protective coatings.
Osmium,
radioactive decay, 266-P
Overvoltage. See Potential, electric.
Oxidation, 134-R, 164-R, 171-R, 302-R. See also under specific metals.
activation energy, 431-R
high temperature, 286-R
Oxides, films on metals, 209-L, 289-L, 321-L, 78-R. See also Anodizing.

Oxides, refractory, 93-R
Oxy-acetylene cutting. See Flame cutting.
Oxy-acetylene welding, 57-K, 145-K, 259-K, 379-K, 438-K, 451-K, 461-K, 516-K, 534-K, 544-K, 546-K, 620-K, 627-K
gas ratios, 129-K
hose maintenance, 431-K
safe practices, 239-A, 664-K
Oxy-kerosene welding, 320-K
Oxygen,
determination, 11-S, 25-S
diffusion, 243-N, 164-P
in copper, 212-E, 112-J
in iron, 56-N, 91-P, 151-P, 410-P, 432-P, 82-Q
in nickel, 212-E, 243-N
in open hearth gas, 292-D
in open hearth slag, 105-D, 309-D
in steel, 259-D, 348-M
in vanadium, 432-P
in zirconium, 81-M
metering, 299-S, 335-S
polarization, 10-P
steelmaking uses, 18-B, 52-D. See also "oxygen enrichment" under specific steelmaking processes.
Packaging,
aluminum foil, 6-R, 234-T, 262-T
corrosion prevention, 541-L, 213-R, 232-R, 330-R, 377-R, 483-R
Paint, 190-L, 95-R, 202-R, 243-R. See also Aluminum paint; Plastics.
adhesion to base-metal, 553-L
antifouling, 161-L, 217-L, 437-R
cellulose lacquer-base, 369-L
chromate-base, 437-R
coloring, 674-L
corrosive action, 462-R
drying and baking, 74-L, 75-L, 86-L
failure, 270-L
foundry mold coat, 55-E
lead cyanamide in, 394-L, 530-L, 141-R
primers, 4-L, 430-L, 535-L, 679-L, 40-R
rubber-base, 222-L, 383-L
temperature-sensitive, 306-S
thickness measurement, 540-L, 323-S
zinc, 641-L
Painting, 5-L, 53-L, 418-L, 421-L, 428-L, 484-L, 603-L, 732-L, 295-R. See also under specific metals and products.
Painting, spray, 20-L, 74-L, 251-L
electrostatic, 144-L, 216-L, 250-L, 606-L, 711-L
hot spray, 87-L, 444-L, 446-L
spray booths, 113-L, 599-L
Palladium,
hydrogen transmission, 52-N
Palladium (cont.)
isotopes, 230-P, 264-P
Palladium-germanium alloys, 372-M
Palladium plating, 179-L
Palladium-silver alloys, 121-P
Particles. See also Metal powders.
size determination, 25-H, 34-H
Patents, U. S. law, 109-A
Pearlite, 277-N, 103-Q
effect on steel transition temperature, 965-Q
grain size, 86-N
growth of, 60-N, 149-N, 155-N
in malleable iron, 134-N, 256-S
Peening. See Shot peening and under specific metals and products.
Pen points, 315-T
Petroleum refining equipment,
aluminum, 266-T
cast iron, 77-T, 351-T, 72-V
clad steel, 139-T
corrosion inhibitors, 294-R, 378-R
corrosion protection, 95-R, 144-R, 185-R, 206-R, 245-R, 253-R, 267-R, 320-R, 325-R, 426-R
stainless steel, 409-R, 16-T, 105-T
Phase diagrams, 65-H, 25-M, 27-M, 137-M, 142-M, 143-M, 158-M, 240-M, 317-M. See also specific metal systems.
Phosphate coatings, 131-L, 162-L, 266-L, 388-L, 715-L
bath analysis, 232-L
chromic acid rinse, 63-L
on coining blanks, 298-G
on steel, 227-G, 68-L, 110-L, 526-L, 615-L
on steel drums, 89-L, 199-L
porosity, 71-R
review, 69-L, 723-L
stripping, 543-L
Phosphor bronze, 524-Q, 121-V
drawing, wire, 261-F
tension, 666-Q
Phosphorus,
determination, 192-S
effect on machinability, 325-G
in aluminum-silicon alloys, 249-M, 398-M, 417-M
in cast iron, 325-G, 307-M, 206-Q, 208-Q
in molybdenum alloys, 399-M
in silver-copper alloys, 293-Q
in steel, 14-D, 291-D, 326-D, 335-D, 370-Q, 627-Q, 936-Q
neutron cross section, 323-P
Phosphoric acid, 55-D, 423-L
Photographic equipment, 182-T. See also Motion picture photography.

Photomicrography, 187-M, 787-Q
Physical chemistry, 61-P, 255-P, 296-P
Physics, review, 315-P, 398-P, 512-P. See also Solids.
Pickling, 104-L, 241-L, 264-L, 290-L, 568-L
accelerators, 485-L
bath heaters, 54-L, 238-L
bright pickling, 375-L
electrolytic, 316-L
equipment, 462-L, 685-L
inhibitors, 485-L, 611-L
mechanized, 261-L
sodium hydride descaling, 739-L
statistical control, 291-L
Pickling waste treatment, 59-A, 125-A, 8-L
Pipes, 29-K. See also Gas pipes; Steam piping; Tubes.
bend cracks, 114-Q
bending, 232-G
cathodic protection, 157-R, 168-R, 203-R, 228-R, 287-R, 358-R, 423-R
costs of, 74-R
equipment, 321-R
high-resistance joints, 318-R
potential difference measurement, 296-R
soil resistivity, 87-R
underwater, 411-R, 482-R
corrosion, 326-R, 388-R, 475-R
bacterial, 46-R, 116-R, 156-R
costs of, 396-R
inhibitors, 85-R, 86-R, 87-R
inspection, 343-R
damping, 642-Q
drawing, 214-F
inspection, 38-S, 211-S
fatigue of high pressure, 400-Q
manufacture, 60-F, 187-F, 307-G
nickel-lined, 285-R
pressure tightness, 38-S
protective coatings, 150-L, 159-L, 323-L, 324-L, 511-L, 596-L, 652-L, 170-R.
bituminous, 118-L, 309-R
cement, 160-L
polyvinylchloride, 414-L
porcelain enamel, 569-L
resistance, 275-L
strength, 379-Q, 958-Q
weld inspection, 430-K
welding, 17-K, 389-K, 404-K, 480-K
welding, arc, 356-K, 381-K, 528-K
welding, inert arc, 208-K, 475-K
welding fixtures, 167-K, 560-K
welding repair, 267-K
Pipes, cast iron, 36-E, 293-S
corrosion, 565-L, 83-R, 344-R, 453-R
inspection, 76-S
specifications, 92-S, 93-S, 194-S, 272-S
Pipes, aluminum, 400-R
Pipes, copper
soldering, 15-K
Pipes, nickel
welding, 576-K
Piston rings
casting, 347-E
Pistons,
aluminum, 173-K, 16-N
inspection, 526-E
welding, 173-K
Planing and shaping, 275-G
Plant layout, 189-A. See also under specific plants, e.g., Foundries
Plastic deformation, 17-Q, 323-Q, 329-Q, 330-Q, 347-Q, 539-Q, 836-Q. See also under specific metals and products; and specific deformation processes
after-effects, 285-Q
anisotropy, 798-Q
deformation bands, 180-Q
effect of specimen geometry, 151-Q
effect of surface-active agents, 1042-Q
equilibrium stress distribution, 1025-Q
high temperature effects, 465-Q
high velocity collision, 301-Q
mechanical-thermodynamic theory of, 525-Q
models, 200-Q, 810-Q
relation to electric resistance, 510-P, 465-Q
relation to hardness, 811-Q
rheological distribution functions, 761-Q
slip, 166-Q, 179-Q, 288-Q, 409-Q, 540-Q, 559-Q, 766-Q, 776-Q, 800-Q, 998-Q
stored energy, 138-Q
strain-hardening, 1017-Q
stress-time relation, 411-Q
twinning, 318-Q, 641-Q
Plasticity, 275-Q, 337-Q, 395-Q, 606-Q, 807-Q. See also under specific metals and products.
ductility, 617-Q, 796-Q
flow limits, 735-Q
grain boundary energy, 429-M
in creep, 784-Q
incremental theory of, 244-Q, 728-Q
limit load theorems, 733-Q
loading surface shape, 727-Q
minimum work curves, 726-Q
models, 220-Q
notch sensitivity, 765-Q

Plasticity (cont.)
photoplasticity, 729-Q
plane problem, 734-Q
pressure effects, 737-Q
rigidity, 467-Q
slip surfaces, 408-Q
stress-strain laws, 730-Q
theories of, 121-Q, 655-Q, 728-Q, 781-Q
yield, 796-Q
Plastics, 653-L, 425-R, 70-T, 99-T, 123-T
cable cores, 168-T
coatings on metals, 271-G, 111-L, 165-L, 222-L, 353-L, 377-L, 437-L, 619-L, 662-L
vinyl, 217-L, 219-L, 425-L, 601-L
dies, 104-G
foundry uses, 95-E
in electroplating equipment, 405-L
metallizing, 46-L, 94-L, 215-L, 504-L, 513-L, 563-L
molds for, 33-T
reinforced, 292-T
Plates, 710-Q, 712-Q. See also Steel plates; Tin plate
bending, 127-Q, 628-Q, 706-Q, 707-Q, 708-Q, 713-Q
compressive buckling, 252-Q, 537-Q, 711-Q, 987-Q, 988-Q
limit design, 735-Q
load distribution, 292-S
notch stresses, 582-Q
plastic deformation, 634-Q
shear stress, 731-Q
strength of riveted, 139-Q
stress analysis, 127-Q, 704-Q
stresses, 125-Q, 679-Q
stresses in perforated, 698-Q
supersonic inspection, 68-S
temperature stresses, 553-Q
Platinum,
corrosion, 163-R, 442-R
crystal growth, 264-N
electrode, 8-P, 159-P
isotopes, 247-P
overvoltage, 8-P
Platinum alloys,
catalyst, 267-T
Platinum amalgams, 413-M
Platinum industry, 170-A
Platinum plating, 179-L, 299-L, 334-L
Plumbing fixtures, 202-G, 53-H, 110-K, 501-L
Plutonium, isotopes, 228-P, 251-P
Polarography, 147-L
Polarographic analysis,
iron, 193-S
lead, 176-L
tin, 47-S, 132-S
Polishing, 322-L, 500-L. See also Chemical polishing; Electrolytic polishing; Tumbling; and under specific metals and products.
compounds for, 80-L, 689-L
deburring, 678-L
dictionary, 61-G
effect on hardness, 108-Q
inside polishing, 349-L
silicone pastes, 456-L
wheels, 44-L, 319-L
Porcelain enameling, 96-L, 125-L, 263-L, 344-L, 433-L, 545-L, 571-L. See also enameling under specific metals and products.
alkali-fluoro-silicate frit, 284-L
base metals
aluminum, 210-L
cast iron, 175-E, 591-E
nickel, 243-L
steel, 30-L, 122-L, 357-L, 659-L
bibliography, 740-L
flash drying precoats, 328-L
furnaces, 233-L
gas evolution in firing, 173-L, 537-L
materials handling, 343-L
opaque glazes, 584-L
pyrophillite in, 72-L
quality control, 643-L
refractories, 570-L
spraying, 132-L, 166-L, 244-L
water treatment, 480-L
Porcelain enameling industry, 102-A
Porcelain enamelware, 21-T
adhesion-to-base, 436-L, 586-L, 357-R
corrosion resistance, 569-L
defects, 188-L, 459-L, 461-L, 661-L, 729-L
expansion strains, 713-L, 959-Q
finishing, 260-L
microstructure, 660-L, 153-M
tensile properties, 694-L
Potassium-indium compounds, 467-P
Potential, electric, 78-P, 106-P, 136-P, 316-P, 376-P
Powder metals. See Metal powders.
Precious metals, 363-T. See also specific precious metals, e.g., Gold.
casting, 393-E
induction melting, 140-C
stamping, 53-G
Precious metal plating, 299-L. See also specific metals, e.g., Platinum plating.
Precipitation. See Age hardening; and under specific metals.
Precision casting, 35-E, 56-E, 79-E, 185-E, 266-E, 320-E, 340-E, 401-E, 408-E, 531-E, 552-E, 561-E, 594-E, 622-E. See also under specific metal foundry practice.

Precision casting (cont.)
alloys for, 326-P
compared with shell molding, 592-E
design, 226-E
melting, 208-E, 597-E
molds, 415-E
pattern dies, 339-E
patterns, 284-E, 338-E
mercury, 322-E
plastic, 541-E
size limitations, 198-E
specifications, 235-S
wax composition, 460-E
Preferred orientation. See Recrystallization.
Press fits. See Fits (machinery).
Press work, 41-G, 211-G, 311-G
automation, 26-G
bibliography, 4-G
books, 144-G, 201-G, 265-G
press brakes, 34-G, 248-G, 254-G
Presses, 14-F, 43-G, 234-G, 253-G, 410-G. See also specific press operations, e.g., Forging.
Pressure
Bourdon tubes, 701-Q
gages, 125-T
high, 155-S
Pressure gas welding, 43-K, 109-K, 126-K, 364-K
Pressure vessels, 118-K, 136-N, 150-R
aluminum, 43-Q, 102-T
corrosion cracking, 96-R
design, 119-K, 480-K, 233-T
forged, 186-F
graphitization, failure, 137-N
overloading, fatigue, 142-Q
steels for, 281-T
stress relief heat treatment, 223-J, 254-J, 118-K
stresses in, 57-Q, 373-Q
supersonic inspection, 199-S, 350-S, 353-S
testing, 275-S
thermal stresses, 554-Q
welding, 118-K, 280-K, 357-K, 396-K, 405-K
welding repair, 500-K
Pressure welding. See Forge welding.
Printing (on metals), 304-L
Projection welding, 172-K, 187-K, 567-K. See also under specific metals and products.
Propellers, 250-E, 474-L, 31-R. See also Aircraft propellers; Ship propellers.
Protactinium, 105-P
Protective atmospheres. See Controlled atmospheres.
Protective coatings, 29-L, 292-L, 419-L, 445-L, 648-L, 297-R, 330-R. See also specific coatings and coating processes, and under specific metals and products.
bituminous, 1-L, 118-L
books, 59-L, 140-L
dielectric strength, 314-L
drying, 149-L, 605-L
heat resistant, 495-L
organic, 364-L, 557-L
review, 21-L
selection, 527-L
spraying, 597-L
thickness measurement, 129-S
Pulp and paper industry
calenders, 310-T
corrosion, 229-R, 424-R, 425-R
digester corrosion, 16-R, 230-R, 361-R, 397-R, 430-R, 464-R, 74-V
drier rolls, 38-K
protective coatings, 619-L
welding repair, 38-K, 438-K
Pumps, electromagnetic, 146-A, 206-A, 212-S
Punched card systems
metals literature, 82-A, 83-A
Pyrometers and pyrometry, 39-S, 394-S
Quality control. See Statistical methods; and under specific products and processes.
Quebec
iron ores, 2-B
Quench hardening, 9-J, 51-J, 98-J, 141-K, 215-N
cracking in, 207-J, 265-J
distortion in, 42-J, 103-J
furnaces 30-J, 50-J, 255-J
hardenability relations, 55-J, 78-J, 230-J, 231-J, 232-J, 357-Q
interrupted, 59-J
lattice defects, 354-M
research, 26-J
short-time cycle, 64-J
stresses in, 369-Q
transformation changes, 193-J, 6-N
Quench hardening media, 10-J, 190-J, 266-J
Radiant heating, 196-T, 318-T
Radiation damage, 390-P, 542-P
Radioactive materials, 95-H, 136-S
half-life measurements, 173-P
in static eliminators, 8-T
processing, 138-C
safe handling, 122-A, 366-S
Radioactive tracers. See also "Isotopes" under specific elements; Radiography.
analysis by, 65-L, 118-S, 177-S

Radioactive tracers (cont.)
blast furnace studies, 194-B
case depth measurement by, 169-S
diffusion studies, 12-N
finishing research, 146-L, 130-S
ore dressing studies, 3-B
porosity determinations, 99-L
properties, 367-S
segregation studies, 2-E, 207-E
separation, 166-S
surface studies, 254-S
uses, 158-S, 257-S, 268-S, 285-S, 354-S, 393-S, 397-S
wear studies, 231-Q
Radiography, 29-S, 66-S, 67-S, 334-S, 364-S, 398-S, 399-S. See also Betatrons; Fluoroscopic inspection; Gamma rays; and x-ray inspection under specific metals and products.
auto-, 40-M, 119-M, 228-M, 374-M
beryllium windows, 116-S
circuits, 98-S
micro-, 119-M, 208-M, 228-M, 374-M
x-ray penetration, 30-S
Radium
beta-spectrum, 243-P
gamma emission, 358-P
Radon, 373-P
Railroad cars, 756-Q, 193-T
aluminum, 63-T, 242-T, 243-T, 258-T
brakes, 202-Q, 813-Q
corrosion, 254-R, 298-R
painting, 113-L
steel construction, 179-T
welding, 131-K, 239-K, 420-K, 1047-Q
wheels, 66-F, 90-T, 242-T, 305-T
casting, 189-E, 232-E
forging, 23-F, 24-F, 48-F, 66-F
Railroad track
end-hardening, 15-J
failure, 217-Q, 483-Q, 83-S, 84-S, 85-S
joint bars, 86-S, 87-S, 88-S
plastic deformation, 398-Q
rolling, 22-F, 62-F, 73-F, 121-F, 238-F, 266-F
shelling, 217-Q, 89-S
stresses in, 218-Q, 483-Q, 833-Q
wear, 756-Q, 758-Q
weld-deposited coatings, 105-L
weld inspection, 226-S
welding, 63-K, 181-K, 387-K
welding, butt, 334-K, 365-K, 366-K
welding, flash, 366-K, 563-K
welding, oxyacetylene, 364-K, 367-K, 368-K
welding, seam, 400-K
welding, stud, 53-K
welding, Thermit, 365-K, 388-K
Rare earths, 225-A, 21-V, 98-V, 100-V. See also specific rare earth elements.
electric resistance, 22-P
flame spectra, 197-S
Hall effect, 502-P
in stainless steel, 118-B, 225-D, 21-V, 29-V
x-ray spectra, 357-M
Rare earths extraction and refining
reduction by metals, 153-C, 155-C
Rare metals, 5-T, 272-T. See also specific metals, e.g., Zirconium.
extraction and refining, 182-B, 32-C, 136-C, 163-C
machining, 145-G
Recrystallization, 33-N, 112-N, 145-N, 746-Q. See also under specific metals and products.
orientation determination, 197-M, 284-M, 285-M
polygonization, 410-M
relation to deformation, 154-N, 746-Q
time-temperature effects, 276-N
Refractories, 43-B, 97-B, 146-B, 153-B, 173-B. See also Ceramics; Steel mills; and under specific furnaces and furnace processes.
Refrigerators and freezers
brazing, 22-K
enameling, 132-L, 249-L
fabrication, 27-T
light-metal, 327-T
welding, 551-K
welding repair, 419-K, 605-K
Research, industrial, 230-A, 276-A, 282-A
Resistance welding, 122-K, 242-K, 303-K, 328-K, 382-K, 462-K, 529-K, 629-K, 678-K. See also specific resistance welding processes, e.g., Spot welding; and under specific metals and products.
bibliography, 636-K
current control, 696-K
current measurement, 158-K
gun corrosion, 358-K
inspection, 618-K
magnetic forces in, 73-K
power supply, 113-K, 144-K, 232-K
roll-spot method, 160-K
safe practice, 281-K
statistical analysis, 423-K
Rhenium
specific heat, 479-P
Rhodium
neutron resonance, 385-P
Rhodium plating, 151-L, 179-L, 207-L, 401-L, 593-L, 705-L

Rivets and riveting, 296-K, 333-K, 380-K, 523-K
automatic riveting, 40-K
electro-riveting, 495-K, 498-K
fatigue, 11-Q
pneumatic equipment, 375-K
pop rivets, 302-K
standards, 204-K
strength, 13-Q, 139-Q, 945-Q
Rockets, 33-F, 50-F, 333-T
Roll-forming, 70-G, 90-G, 117-G, 150-G, 243-G, 256-G, 296-G
Rolling, 49-F, 58-F, 61-F, 130-F, 218-F, 222-F, 255-F. See also under specific metals and products.
effect of speed, 11-F
historical review, 271-F
lubricants, 231-F
plastic deformation, 748-Q, 803-Q
preheating, 71-F, 101-F
recrystallization, 284-M
roll maintenance, 135-F
roll pass design, 62-F, 91-F
rolls, chromium-plated, 455-Q
rolls, copper-plated, 460-L
stresses in, 658-Q
temperature effects, 283-Q
Rolling mills, 41-F, 95-F, 138-F, 183-F
control, 207-F, 275-F, 276-F
design, 206-F
electric drive, 27-F, 153-F, 275-F
high-speed, 204-F, 208-F
instrumentation, 120-S
lubrication, 74-F
mechanical handling, 56-F
power consumption, 67-F
thickness gage, 143-S
Rolling mills, bar and rod, 1-F, 86-F, 196-F, 203-F, 209-F, 230-F.
rebuilt, 102-F, 103-F
roll pass design, 147-F
Rolling mills, blooming and slabbing, 76-F 101-F, 116-F, 156-F, 184-F, 202-F, 205-F, 278-F, 279-F
Rolling mills, plate and sheet, 38-F, 45-F, 213-F
Rolling mills, strip, 243-A, 132-F, 144-F, 160-F, 171-F, 172-F, 174-F, 228-F, 233-F, 239-F
control, 83-F, 118-F
lubrication, 68-F
roll pressures, 200-F, 273-F, 283-F
speed variation, 221-F
tension control, 240-F
thickness gage, 52-S, 142-S, 173-S
thin strip, 16-F, 89-F, 193-F, 265-F
Roofing and siding, 279-T. See also Buildings, aluminum.
Rubber, 40-R, 74-T
molds for, 47-H, 171-T
Rubber, chlorinated, 383-L
Rubber pad forming, 12-G, 231-G, 244-G, 301-G, 382-G
Rubidium isotopes, 175-P, 177-P, 236-P
Russia,
metal industry, 259-A, 283-A
metallurgical texts, 105-A
mineral resources, 79-B
science in, 258-A
steel industry, 128-D, 316-S
tool industry, 149-S
welding industry, 13-K, 139-K
Ruthenium plating, 154-C
Salt baths, 87-J, 138-J, 200-L, 67-T
Samarium, 81-C
Sampling, 7-B, 95-S, 198-S, 276-S, 410-S
Saws and sawing,
friction, 67-G
Scaling. See under Corrosion; Oxidation.
Scandium,
isotopes, 365-P
recovery by ion-exchange, 83-C, 167-S
Scrap metal, 90-A, 145-A, 300-A. See also specific metals, e.g., Copper scrap.
classification, 284-A, 188-S, 388-S
cupola charge, 599-E
fire hazard, 119-A
inspection of baled, 122-B
melting furnaces, 37-D
Sea water distillation, 117-R, 474-R
Selenium, 110-V
electric properties, 455-P
specific heat, 406-P
structure, 281-M, 433-M
Selenium rectifiers, 175-L
Semiconductors, 279-P, 312-P. See also Germanium; Intermetallic compounds; Silicon; Transistors; and specific alloy systems, e.g., Indium-antimony alloys.
Shafts. See also Crankshafts.
forging, 47-F
torsion, 626-Q, 670-Q, 688-Q, 689-Q
Shear (stress), 61-M, 25-Q, 278-Q, 511-Q, 555-Q, 731-Q. See also under specific metals, products, and processes.
Shearing and trimming, 146-F, 313-G, 370-G
Sheet metal, 447-L. See also specific metals, e.g., Steel sheet.
damping, 214-Q
gages, 104-S
neutral holes, 1010-Q
painting, 87-L

Sheet metal (cont.)
shear, 278-Q
surface strain marks, 94-S
welding, 323-K, 369-K, 373-K, 669-K
Sheet metalwork, 33-G, 63-G, 142-G, 170-G, 217-G, 366-G, 206-T. See also specific working processes, e.g., Drawing (metal).
Shells (metalwork), 54-F
buckling, 446-Q
drawing, 98-G, 262-G, 326-G, 329-G
forging, 224-F
welding, 18-K
Shells (ordnance), 333-T
casting, 381-E
finishing, 380-L
forging, 211-F
presswork, 257-G, 278-G
tungsten carbide cores, 24-H, 36-H, 56-H
Ship propellers,
corrosion, 250-R, 410-R
surface damage, 279-R
Ships, 65-T
aluminum in, 141-T, 317-T
bending stresses, 54-Q, 425-Q
cathodic protection, 4-R, 45-R, 186-R, 246-R, 372-R, 464-R
corrosion, 184-R, 191-R
frames, testing, 333-S
hatch corners, welded, 487-K
painting, 161-L, 217-L, 45-R
structural behavior, 16-Q, 54-Q
welding repair, 182-K, 243-K, 469-K, 574-K
Ships, welded, 4-K, 195-K, 263-K, 286-K, 414-K, 482-K, 506-K, 527-K, 630-K
aluminum, 569-K
failure, 69-K, 488-K, 198-Q, 636-Q, 860-Q, 122-S
inspection, 334-S
welding stresses, 412-Q, 827-Q
Shot peening, 100-G, 101-G, 319-G, 373-G, 414-G, 417-G. See also under specific metals and products.
Shrink fitting. See Fits (Machinery).
Silicates, 289-D
Silicides, 309-M
Silicon, 40-V
crystallization from melts, 118-N
domain patterns, 39-P
in aluminum alloys, 390-G
in blast furnace slag, 74-D
in brass, 1014-Q
in cast iron, 118-V
in iron, 275-D, 410-P
in steel, 254-D, 229-J
isotopes, 344-P, 271-S
melting, 79-C
Silicon (cont.)
photoconductivity, 149-P
plastic deformation, 8-Q
plasticity, 9-Q
semiconductor, 232-P, 287-P, 360-P, 368-P, 471-P
specific heat, 18-P
surface tension, 457-P
thermoelectric properties, 287-P
transistors, 281-P, 264-T
Silicon carbides,
crystal growth, 13-M
grinding wheels, 92-G, 156-G, 263-G
refractories, 30-B
Silicon diffusion coatings, 72-J, 267-J, 448-L, 520-L
Silicon dioxide
protective glaze, 222-R
Silicon-gallium alloys, 153-N
Silicon-indium alloys, 153-N
Silicon steel, 55-T
domain structure, 39-P, 119-P
electric resistance, 19-P
flame hardening, 66-G
magnetization, 187-P
nucleation and grain growth, 127-N
recrystallization, 17-N, 108-N
rolling, 81-F
Silicon-tantalum alloys, 144-M, 310-M
Silicon-zirconium alloys, 223-M, 412-M
Silicones, 202-L, 456-L, 662-L
Silver
antimony diffusion in, 317-N
diffusion in copper, 317-N
dislocations and growth, 126-N
electrode potential, 9-R
hardness, 413-Q
ion-exchange, kinetics, 353-P
isotopes, 269-P, 366-P
optical properties, 73-P
reaction with cyanides, 473-P
self-diffusion, 3-N, 27-N, 111-N
separation by electrodeposition, 377-P
strain gages, 383-Q
surface tension, 109-P
thermal conductivity, 493-P
thermionic constants, 341-P
thermoelectric properties, 253-P
vapor pressure, 261-P, 262-P
work function, 224-P
Silver alloys, 286-T, 85-V
diffusion, 296-N
oxidation, tarnishing, 339-R
wire, 32-F
Silver-aluminum alloys, 31-V
Silver amalgams, 37-H
Silver brazing, 147-K, 233-K, 530-K, 616-K, 621-K

Silver-cadmium alloys, 116-N
Silver chloride
irradiation, 752-Q
Silver coatings, 629-L
Silver-copper alloys, 293-Q
Silver extraction and refining
distillation, 25-C
liquation, 24-C
separation of metals, 177-C, 377-P
Silver industry, 169-A
Silver ores, 37-B
Silverplate, 141-L
burnishing, 297-L
finishing, 268-L
lacquering, 301-L, 618-L
structure, 180-N
tarnish removal, 310-L
Silver plating, 19-L, 98-L, 187-L
aluminum, 256-L, 472-L
anodes, 300-L
brighteners, 65-L
surface preparation, 246-L
Silver powders, 117-H
Silver soldering, 205-K, 363-K
Silver-tellurium alloys, 503-P, 504-P
Silver-tin alloys, 1043-Q
Silver-titanium alloys, 173-M
Silver-zinc alloys, 354-M, 316-Q, 470-P
Silver-zirconium alloys, 121-M
Slags. See also specific process and furnace slage, e.g., Openhearth slag.
attack on furnace linings, 134-E
basicity, 144-B
copper in, 74-C
electric conductivity, 26-B, 154-B
ladles, 5-E
metal equilibria, 124-B
pH, 26-B
phosphoric acid solubility, 55-D
physical chemistry of, 96-B, 216-B, 103-D
Sloan, Alfred P., Foundation Inc., 10-A
Soaking pits, 165-F, 185-F
cleaning, 164-F
instrumentation and control, 90-F, 139-F
Sodium
adsorption on pyrite, 99-P
in aluminum-silicon alloys, 94-E, 174-M, 249-M, 398-M, 417-M
isotopes, 184-S
neutron cross section, 156-P, 324-P
pumping liquid, 212-S
Sodium carbonate, 235-D
Sodium chloride, 288-Q
Sodium-lead alloys, 294-M
Solders and soldering, 231-K, 336-K, 341-K, 434-K. See also Brazing; and under specific metals and products
Solders and soldering (cont.)
books, 58-K, 706-K
finishes for, 370-L, 443-L, 552-L
flow temperature, 363-K
fluxes, 591-K
heated air, 311-K
hot dipping, 443-L, 552-L
mechanized dip, 327-K, 429-K
supersonic method, 48-K, 135-K, 136-K
Solid-liquid reactions, 313-M, 317-M, 160-N, 175-N, 185-N, 220-N, 261-N, 278-N. See also under Crystals; and under specific metals and processes.
Solid solutions, 110-M, 390-M, 161-N. See also Intermetallic compounds and specific metal systems.
Solids, physics of, 100-M, 1-N, 210-N, 30-P, 61-P, 396-P
South Africa
ore deposits, 8-A
Spain
steel industry, 99-A
Specific heat, 203-M
Specifications and standards, 301-A, 156-S, 210-S, 325-S, 345-S
tolerances, 233-S, 328-S, 359-S, 395-S
Spectrographic analysis, 125-S, 225-S, 331-S
Spectrometers, 102-M, 197-M, 106-Q, 271-S, 294-S
Spinning (metal), 133-G, 148-G, 242-G, 286-G, 374-G, 402-G
Sponge iron, 62-D, 113-D, 114-D
Krupp-Renn process, 33-D, 127-D, 185-D 318-D
rotary kilns, 319-D, 320-D, 322-D
Wiberg process, 323-D
Spot welding, 47-K, 169-K, 184-K, 223-K, 292-K, 323-K, 361-K
control, 658-K
design for, 149-K
joint strength, 342-Q
machines, 291-K, 468-K, 496-K, 513-K
thermal processes in, 12-K
Springs
creep of aluminum, 88-Q
design, 110-A, 239-T, 334-T
die springs, 250-Q
fatigue testing, 907-Q
Springs, steel, 24-T, 271-T
fabrication, 8-G
fatigue, 304-Q, 384-Q
properties, 64-Q, 620-Q, 849-Q
testing, 51-S
weight of tempered, 232-S
Stainless steel, 17-T, 29-T, 50-V
aging, 64-N, 290-N, 291-N, 54-V, 65-V

Stainless steel (cont.)
analysis, 135-S
annealing, 37-J, 160-J
bending, 215-G
case hardening, 29-J
cleaning, 32-L, 230-L, 347-L, 559-L, 684-L
compositions,
substitute, 232-Q, 402-Q, 69-T, 88-T, 38-V, 83-V, 97-V
tabulated, 266-S
corrosion, 72-R, 282-R, 359-R, 398-R, 427-R, 29-V
acid, 109-R, 126-R, 149-R, 190-R, 332-R, 336-R, 467-R
atmospheric, 468-R
high temperature, 242-R
intergranular, 35-R, 452-R
organic chemicals, 198-R
oxidation, 351-R, 395-R
steam, 327-R
stress, 70-R, 122-R, 394-R
testing, 124-R
creep, 124-M, 386-Q
diffusion in, 205-N
directory, 207-A, 266-S
drawing, 252-F, 136-G, 215-G, 241-G
drilling, 233-G
electrolytic polishing, 640-L
extrusion, 98-F
fabrication, 123-F, 99-G, 272-G, 280-T
fatigue, 774-Q
friction, 353-Q
heat resistance, 319-R
heat treatment, 46-J, 114-J
in buildings, 116-T
in chemical equipment, 449-R, 91-T, 105-T
in coal processing, 38-T
in filters, 32-T
in food industry, 104-T, 106-T
in medical equipment, 157-T
in petroleum refining equipment, 409-R, 16-T, 105-T
in photographic equipment, 37-T
in resistance welders, 358-K
in valves, 119-T
low temperature behavior, 888-Q
machinability, 233-G, 288-G, 376-G
machining, 119-G, 151-G, 258-G, 261-G
magnetic properties, 80-F, 44-P
passivation, 195-R, 446-R
plasticity, 403-Q
polishing, 193-L, 309-L, 579-L, 639-L, 356-P
presswork, 138-G
properties, 140-R, 354-T
reflectance, 356-P

Stainless steel (cont.)
rolling, 81-F
Russian, 42-V
spinning, 242-G
sprayed coatings, 463-L
stretch-forming, 276-F, 27-G, 320-G, 380-G
Swedish, 24-V
thermal conductivity, 126-H
transformations, 33-M, 85-M, 136-M, 62-N, 283-N
welding, 21-K, 49-K, 88-K, 93-K, 166-K, 217-K, 225-K, 238-K, 280-K, 297-K, 415-K, 608-K, 614-K, 645-K
welding, arc, 52-K, 137-K, 155-K, 264-K, 478-K, 612-K, 695-K
welding backups, 85-K, 277-K
welding books, 250-K
welding fluxes, 255-K
welding, gas, 56-K, 246-K, 695-K
welding, inert arc, 104-K, 528-K, 670-K, 695-K, 697-K
welding, oxy-acetylene, 104-K
welding, resistance, 1-K, 479-K
welding, seam, 185-K
welding, spot, 1-K, 55-K, 104-K, 322-K, 550-K, 585-K
welding, submerged arc, 199-K
welds,
cracking, 580-K
discoloration, 124-L
working, effects of, 80-F, 159-Q
Stainless steel foundry practice,
precision casting, 229-E, 326-T, 170-T
shell molding, 563-E
Stainless steel melting practice, 10-B, 7-D. See also Electric furnace steelmaking.
addition agents, 117-B
rare earth additions, 118-B, 225-D
Stamping, 188-F, 53-G, 97-G, 163-G, 220-G, 396-G, 103-K. See also Coining (metalwork).
Standard cells, 158-P
Statistical methods, 249-S
analysis of test data, 333-Q, 334-Q, 335-Q, 50-R, 405-S
dimensional control, 233-S
in measurement, 360-S
quality control, 105-S, 106-S, 137-S, 308-S, 410-S. See also under specific products and processes.
Steam pipes, 295-K, 835-Q, 296-T
Steam plants
corrosion, 47-R, 77-R, 98-R, 305-R, 308-R, 327-R, 365-R
Steam turbines, 368-R, 265-T
Stearic acid, 130-R

Steel, 33-A, 850-Q, 864-Q, 47-T, 249-T, 352-T, 6-V, 29-V, 106-V, 123-V, 124-V, 125-V. See also specific alloy steels; Bessemer steel; Cast steel; and steel products
abrasive blasting, 479-L, 581-L
aging, 4-N, 45-N, 93-N, 199-N, 214-N, 287-N, 81-Q, 289-Q, 464-Q, 477-Q
allotropic transformation, 106-N
aluminum coating. See Aluminum coatings, on steel.
anelasticity, 749-Q
analysis, 1-S, 119-S, 157-S, 159-S, 225-S
boron, 108-S
cadmium,182-S
hydrogen, 35-S, 60-S, 290-S
bending, 110-Q, 780-Q
boron in. See Boron steel.
clad. See Clad steel.
cleaning, 209-L, 214-L, 272-L, 303-L, 468-L, 487-L, 650-L, 681-L
cold treatment, 242-N, 303-N
compositions, tabulated, 14-S, 170-S
compression, 842-Q, 865-Q
corrosion, 105-R, 238-R, 373-R, 447-R
acid, 43-R, 89-R, 99-R, 130-R, 148-R, 353-R, 430-R
aqueous, 52-R, 379-R
atmospheric, 254-R, 261-R, 418-R, 461-R
biological, 259-R, 441-R
chlorinated water, 62-R
gases, 22-R
glycols, 375-R
hydrogen penetration, 123-N, 66-R, 192-R, 293-R
literature review, 440-R
organic compounds, 369-R
scaling, 137-F, 994-Q, 81-R
sea water, 337-R
soil, 24-R, 25-R, 393-R
stress, 303-R, 438-R, 494-R
creep, 123-Q, 130-Q, 195-Q, 222-Q, 851-Q, 852-Q, 904-Q, 1006-Q
effect of heat treatment, 47-J, 23-Q
room temperature, 153-Q, 235-Q, 439-Q
descaling, 43-F, 393-L
drawing, 39-G, 179-G, 264-G
drilling, 118-G, 264-G
elasticity, 144-Q, 364-Q, 653-Q, 660-Q
electrolytic polishing, 718-L
embrittlement, 384-L, 123-N, 286-N, 69-Q, 92-Q, 910-Q, 66-R, 192-R, 293-R. See also under Tempering.
etching, 67-L, 12-M, 93-M, 403-M

Steel (cont.)
extrusion, 298-A, 30-F, 33-F, 50-F, 72-F, 119-F, 142-F, 197-F, 244-F, 247-F, 249-F, 251-F, 258-F
extrusion, impact, 223-G, 224-G, 225-G, 226-G, 227-G, 228-G, 314-G
fatigue, 41-Q, 144-Q, 145-Q, 201-Q, 260-Q, 314-Q, 774-Q, 780-Q, 838-Q, 962-Q
fatigue of chrome-plated, 134-L, 509-L 140-Q, 569-Q
fatigue of flame cut, 291-Q, 1023-Q
fatigue of plated, 66-Q
fatigue testing, 241-Q
finishing, 204-L
flame cleaning, 1018-Q
flame cutting, 77-G, 174-G, 283-G, 43-J, 407-K, 291-Q, 1023-Q
flame hardening, 31-J, 96-J
forging, 43-F, 46-F, 59-F, 77-F, 109-F, 115-F, 274-F, 33-J, 109-S
fracture, brittle. See Fracture, brittle.
friction, 350-Q
glass-coated, 143-L, 401-R
graphitization, 136-N, 137-N, 288-N
grinding, 404-G
hardenability, 161-J, 193-J, 204-J, 230-J, 232-J, 274-J. See also Boron steel.
hardness, 192-J, 199-N, 271-N, 14-Q, 357-Q, 367-Q, 437-Q, 764-Q
heat resistant, 178-Q, 359-Q, 530-Q, 910-Q, 942-Q, 365-R, 19-V
heat treatment, 3-J, 47-J, 82-J, 92-J, 102-J, 119-J, 158-J, 171-J, 531-Q, 615-Q
heterogeneity, 64-M
high-strength, 493-Q, 982-Q, 985-Q, 179-T
high temperature behavior, 282-F, 125-P, 109-Q, 157-Q, 374-Q, 793-Q, 1019-Q, 1020-Q,
identification, 141-S, 318-S
impact strength, 357-Q, 376-Q, 378-Q, 437-Q, 464-Q, 513-Q, 527-Q, 614-Q, 649-Q, 764-Q, 865-Q, 985-Q, 997-Q
in transportation equipment, 312-T
inclusions, 289-D, 329-M, 962-Q, 320-S
inspection, 358-S
Japanese, 9-V
low temperature behavior, 365-Q, 943-Q, 1-T
machinability, 159-D, 2-G, 36-G, 62-G, 78-G, 79-G, 94-G, 407-G, 49-M, 283-M, 298-Q, 1004-Q, 174-T
machining, 173-G, 222-G, 244-G, 285-G
magnetic properties, 217-P, 145-Q, 65-T
magnetic susceptibility, 129-P
mechanical properties, 381-Q, 463-Q, 673-Q, 859-Q, 869-Q

Steel (cont.)
microstructure, 49-M, 95-M, 134-M, 411-M, 281-N, 980-Q
milling, 152-G
minor elements in, 171-B, 183-B, 184-B
painting, 68-L, 197-L, 220-L, 303-L, 466-L, 468-L, 663-L, 52-R, 312-R
passivation, 448-R, 254-S
plastic deformation, 132-Q, 260-Q, 1039-Q, 1047-Q
plasticity, 807-Q, 949-Q
presswork, 56-G, 249-G, 252-G
protective coatings, 22-L, 85-L, 184-L, 209-L, 276-L, 289-L, 389-L, 582-L, 645-L, 223-R, 312-R, 338-R, 493-R
recovery, 286-N
recrystallization, 47-N, 207-N, 301-N
roll-forming, 243-G
segregation, 101-D, 117-D, 653-K, 683-K, 129-M, 333-M, 805-Q, 818-Q
shear, 949-Q
shot peening, 124-G, 191-N
soldering, 377-K
specifications, 870-Q, 154-S, 379-S
stamping, 39-G, 369-G
stress-rupture, 846-Q
stresses, 269-J
surface impregnation, 200-L, 52-M, 36-N, 78-N
tapping, 240-G
tensile strength, 694-L, 182-Q, 230-Q, 378-Q, 490-Q, 513-Q
torsion, 867-Q
toughness, 682-Q
transformation changes, 46-N, 50-N, 106-N, 114-N. See also Austenite; Bainite; Cementite; Ferrite; Martensite; Pearlite.
electron microscopy study, 66-M
grain size effects, 86-N
heating rate effects, 248-N
shot peening effects, 124-G, 191-N
stabilization, 187-N
TTT curves, 151-N, 271-N, 279-N
thermodynamics of, 318-N
wear, 839-Q, 1040-Q
weldability, 123-K, 251-K, 316-K, 386-K, 552-K, 637-K, 653-K, 683-K, 611-Q, 238-R, 257-T
weldability tests, 64-K, 317-K, 331-K, 698-K
welding, 56-K, 203-K, 206-K, 411-K, 566-K, 607-K, 646-K, 695-K, 360-Q, 570-Q
welding, arc, 140-K, 381-K, 446-K, 501-K 541-K, 603-K, 672-K
electrodes, 146-K, 253-K, 440-K, 562-K, 577-K, 583-K, 660-K, 704-K
welding, flash, 211-K, 305-K
welding, forge, 276-K
welding, inert arc, 101-K, 193-K, 198-K,

Steel (cont.)
welding, flash, 211-K, 305-K
welding, forge, 276-K
welding, inert arc, 101-K, 193-K, 198-K, 208-K, 220-K, 338-K, 343-K, 383-K, 458-K, 570-K, 656-K
welding, literature review, 177-K
welding, oxy-acetylene, 23-K, 399-K, 762-Q
welding, resistance, 581-K
welding, seam, 397-K
welding, spot, 24-K, 290-K, 304-K, 542-K
welding, stud, 285-K
welding, submerged arc, 18-K, 593-K
welds, 212-K
corrosion, 276-R
cracking, 188-K, 228-K, 595-K, 186-Q, 612-Q
gas content, 200-K, 444-K
heat treatment, 118-K, 142-K
porosity, 220-K, 656-K
strength, 495-K
stresses, 74-K
working, 117-F, 126-G, 162-G, 229-N, 105-Q, 1004-Q
wrought, 961-Q
yield strength, 27-Q, 53-Q, 63-Q, 81-Q, 360-Q
zinc-coated. See Galvanized sheet.
Steel bars, 311-D, 311-T
buckling, 759-Q
drawing, 148-F, 179-G
extrusion, 248-F
heat treatment, 167-J, 177-J
plastic deformation, 564-Q
rolling, 19-G
stresses in, 799-Q, 935-Q
Steel industry, 197-A, 219-A, 25-D, 75-D, 134-D, 215-D. See also under names of countries and geographic areas.
AISI yearbook, 39-A
consumption forecast, 231-A
costs, 293-A
directory, 134-A, 245-A, 26-D
labor force, 111-A, 295-A
review, 40-A, 76-D
world production, 57-A, 148-A
Steel ingots, 207-D
casting, 112-D
chipping and scarfing, 69-F, 84-F, 102-G, 112-G
cracking, 39-D, 144-S
heat transfer, 86-D, 40-F
heating, 70-F
ingot cars, 8-D
silicon-capped, 254-D, 304-D
skin thickness, 72-D
solidification, 73-D

Steel ingots (cont.)
statistical control, 105-S
surface defects, 65-D, 71-D, 160-D
Steelmaking, 60-D, 238-D, 321-D, 337-D, 367-D. See also specific steelmaking processes.
comparative investment costs, 89-A, 289-A, 331-D
comparative operating costs, 288-A, 352-D
fuel, 172-B, 67-D, 167-F
pouring, 11-D
Steel mills
air pollution, 5-A, 107-A, 3-D, 7-E
Armco, 4-D
Bethlehem Steel Co., 133-D
control, 134-S, 258-S
electrical equipment, 203-A, 220-D, 328-D
gas generators, 69-B
materials handling, 203-A, 204-A
Summers, John, Ltd., 191-A, 194-D
maintenance, 603-L, 357-S
painting, 603-L
plant layout, 312-A, 316-A, 330-D
power supply, 357-D
refractories, 138-B, 226-B, 1-D, 85-D, 136-D, 305-D
safety, 128-A
water supply, 140-S
welded frames, 370-K
welding repair, 222-K, 534-K, 594-K
Steel, molten, 231-D, 260-D. See also under specific steelmaking processes; and Iron, molten.
attach on refractories, 115-D
decarburization, 197-D, 308-D, 346-D, 355-D, 127-P
deoxidation, 152-B, 21-D, 38-D, 156-D, 161-D, 265-D, 272-D, 295-D, 311-D, 214-N
desulfurization, 16-D, 36-D, 77-D, 95-D, 230-D, 22-M, 41-P, 43-P
fluidity, 57-E, 348-E
manganese distribution, 187-D
sampling, 25-S
temperature measurement, 40-S, 72-S, 160-S, 161-S, 162-S, 163-S, 195-S
Steel plates,
bending, 3-Q
damping, 1037-Q
fatigue, 1001-Q
fatigue of welded, 187-Q
fracture, 56-Q, 154-Q
welding, arc, 19-K
x-ray inspection, 66-S
Steel powders, 63-H, 99-H
Steel scrap, 222-A, 315-A, 341-D
Steel sheet,
corrosion, 59-R
drawability, 42-G, 268-Q
edge finishing, 155-F
enameling, 659-L
fabrication, 27-T
plastic deformation, 953-Q
printing, 258-L
surface area, 43-L
wear, 999-Q
weldability, 64-K
Steel, structural, 66-T, 73-T, 97-T, 200-T. See also specific structures, e.g., Pressure vessels.
bend test, 529-Q
Belgian, 213-S
compositions tabulated, 506-Q
fatigue, 144-Q, 145-Q
hardenability, 294-Q
prestressed, 357-T
stress analysis, 128-Q
tensile strength, 611-Q
weldability, 76-K
welding, 437-K, 445-K, 532-K
Steel wool, 256-A
Stoves, 637-L, 11-T
Straightening, 256-F
Strain aging. See Aging.
Strain gages, 177-Q, 310-Q, 432-Q, 760-Q, 820-Q
book, 957-Q
calibration, 916-Q
counter, 584-Q
electric circuits, 361-Q, 383-Q
"Fleximeter", 597-Q
foil, 2-Q, 155-Q
mercury, 955-Q
photogrids, 580-Q
pressure effects, 609-Q
recorders, 226-Q, 581-Q
strip charts, 390-Q, 486-Q
waterproofing, 596-Q
Strains and stresses, 49-Q, 191-Q, 344-Q, 444-Q, 583-Q
after-effects, 630-Q
birefringence, 855-Q
contact stress, 543-Q
effect of specimen geometry, 115-Q
explosive, 39-Q
finite, defined, 725-Q
high speed measurements, 638-Q
high temperature, 51-Q, 399-Q
in rotating parts, 418-Q, 514-Q, 593-Q, 662-Q
inclusions, 346-Q
longitudinal plane waves, 420-Q, 586-Q, 594-Q

Strains and stresses (cont.)
mathematics, 331-Q
notch effects, 296-Q, 546-Q, 582-Q, 608-Q
orthotropic, 423-Q, 424-Q
pressure effects, 345-Q
review, 393-Q
single crystals, 79-Q
static strength, 213-Q
surface strains, 787-Q, 887-Q
theory of, 417-Q, 502-Q, 532-Q
theory of resistance to, 617-Q
thermal, 215-Q, 915-Q
thermoelectric effects, 449-P
wedge indention, 321-Q, 322-Q
Strains and stresses, residual, 245-Q, 450-Q
effect on ductility, 623-Q
effect on fatigue, 101-Q
effect on strength, 718-Q
in phase transformation, 779-Q
in surface hardening, 585-Q
measurement of, 116-Q, 125-Q, 240-Q, 336-Q, 510-Q
surface, optical study, 599-Q
Street railways, 443-K, 147-T, 188-T
Stress analysis, 89-Q, 203-Q, 280-Q, 484-Q, 488-Q, 595-Q, 656-Q
brittle coating method, 516-Q, 592-Q, 598-Q, 677-Q, 704-Q, 48-S
drilling method, 149-Q
in machine design, 375-Q
photo-elastic method, 93-Q, 127-Q, 267-Q, 391-Q, 447-Q, 536-Q, 579-Q, 605-Q, 703-Q, 705-Q
relaxation method, 394-Q
x-ray method, 400-M, 106-Q, 332-Q, 431-Q, 435-Q
Stress corrosion, 113-Q, 9-R, 67-R, 96-R, 120-R, 122-R, 135-R, 342-R, 444-R, 122-S
Stress-relief heat treatment, 27-J, 38-J, 116-J, 136-J, 137-J, 151-J, 223-J, 224-J, 244-J, 254-J, 342-R
Stress-rupture, 21-Q, 305-Q
Stretch-forming, 64-G, 85-G, 91-G, 110-G, 168-G, 175-G, 212-G, 217-G, 235-G, 236-G, 249-G. See also under specific metals.
Strip metal, 41-G
Strip steel
annealing, 89-J, 90-J, 91-J, 139-J, 175-J
directional strength, 868-Q
descaling, 393-L
drawing, 39-G
heat treatment, 176-J
painting, 220-L
rolling. See Rolling mills, strip.
Strip steel (cont.)
tempering, 178-J
welding, 561-K
Strontium
allotropic forms, 219-N
isotopes, 177-P, 236-P, 386-P
Structures, 370-S. See also Steel, structural; and specific structures, e.g., Buildings.
limit design, 736-Q
strength, 275-Q
welded, 71-K, 554-K
Stud welding, 224-K, 329-K, 485-K, 600-K, 692-K
Submarines, 213-T, 254-T
Submerged arc welding, 121-K, 163-K, 230-K, 282-K, 324-K, 355-K, 464-K, 663-K
Sugar manufacture, 89-R
Sulfur, 218-B, 219-B. See also "desulfurization" under Steel, molten; and specific steelmaking processes.
determination, 65-L, 32-R, 205-S
in coal, 168-B
in copper, 259-P
in cast iron, 139-E
in fuel oil, 169-D
in steel, 43-P, 936-Q, 389-R
effect on machinability, 283-M
effect on surface, 2-D, 71-D, 160-D
effect on workability, 159-D, 117-F
solubility, 22-M
Sulfur dioxide
corrosive action, 43-R, 99-R, 221-R, 386-R
Sulfur organic compounds,
corrosive action, 350-R
Sulfuric acid
corrosive action, 92-Q, 10-R, 138-R, 148-R, 149-R, 190-R, 301-R
Superconductors, 113-P, 435-P
acoustic waves, 96-P
isotope effect, 27-P
magnetic field effects, 80-P, 122-P, 431-P
properties at low temperature, 26-P, 103-P
thermal conductivity, 413-P
Superlattice formation, 176-N, 226-N, 265-N
effect of neutron irradiation, 310-N
stability, 83-N
statistical theory, 184-N
thermodynamics of, 165-P
Supersonic waves, 99-S, 250-S, 315-S
in Bessemer process, 359-D
in cleaning, 252-L, 253-L, 416-L, 516-L

Supersonic waves (cont.)
in soldering equipment, 135-K, 136-K, 16-L, 469-L
metallurgical uses, 93-E, 128-S, 363-S
thickness measurement, 206-S, 263-S
Supersonic waves, inspection by, 42-S, 45-S, 46-S, 50-S, 97-S, 133-S, 282-S, 305-S, 307-S, 311-S, 339-S, 352-S, 390-S
castings, 230-S, 350-S, 351-S
crankshafts, 329-S
flasks, 199-S
forgings, 109-S
jet engines, 281-S
pipe corrosion, 315-R, 343-R, 76-S
sheet, 68-S
tubes, 53-S
welds, 74-S, 313-S, 353-S, 368-S, 386-S, 391-S
wire, 403-S
Surface active agents,
detergency, 178-L
evaluating, 578-L
in machining, 68-G
nonionic, 198-L
Surface roughness measurement, 43-S, 231-S, 246-S, 260-S, 369-S
electric tester, 21-S, 401-S, 402-S
interferometer, 94-S, 96-S, 342-S
"Profilometer", 347-R
specifications, 22-S, 56-S, 185-S, 186-S
"Taly-surf", 94-S
Surfaces
area measurement, 100-H, 43-L, 369-S
autoradiography, 40-M
electron microscope studies, 6-M, 15-M, 23-M, 47-M, 97-M, 397-M, 184-Q, 457-Q
replicas, 315-M, 335-M
explosive driven, 81-P
interference colors, 187-S
interferometry, 337-S, 339-T
ionization, 477-P
permeability, 100-H
properties, 1051-Q
structure of deformed, 299-M
surface energy, 69-P
temperature of, 39-S, 400-S
x-ray examination, 254-M
Swaging, 188-F
Swarf. See Scrap metal.
Sweden
steel industry, 121-A, 24-V
Taconite, 222-B
beneficiation, 48-B, 61-B
Norwegian, 230-B
pelletizing, 66-B
reduction process, 121-B
Tanks (ordnance)
cast parts, 491-E
heat treatment, 104-J
shot blasting, 479-L
welding, 36-K
Tanks (storage). See also Pressure vessels; Water tanks.
corrosion, 434-L, 92-R
fabrication, 99-G
field assembly, 207-T
cathodic protection, 204-R, 310-R
welding, 1-K, 299-K, 345-K
Tantalum, 185-A, 151-T, 68-V, 114-V
anelasticity, 317-Q
determination, 212-S
electrochemical potential, 105-P
gas diffusion in, 164-P
separation from columbium, 183-S
vacuum-melting, 82-C
Tantalum alloys, 76-M
anodizing, 373-L
embrittlement, 159-R
Tantalum ores, 17-C, 162-B
Tantalum-silicon alloys, 144-M, 310-M
Technetium, 98-C
Television receivers, 327-K, 227-T
Tellurium
layer thickness, 50-P
single crystals, growth, 53-N
specific heat, 277-P
superconductivity, 431-P
thermoelectric properties, 503-P, 504-P
Tellurium-antimony alloys
electric properties, 57-P
Tellurium-silver alloys, 503-P, 504-P
Temperature
effect on metal properties, 872-Q
thermal shock, 915-Q
Temperature control, 172-S, 216-S, 253-S
Temperature measurement, 33-S, 274-S. See also Pyrometers and Pyrometry; Thermocouples; Thermostats and under Steel, molten.
film color, 17-S
heat-sensitive paint, 306-S
high temperature, 244-S
low temperature, 49-S
thermo-electric devices, 57-S, 312-S
Tempering, 182-J, 489-Q
austenite decomposition, 74-N
carbide formation, 88-J, 266-N
effect on hardness, 192-J, 357-Q
embrittlement, 138-M, 277-Q, 365-Q, 366-Q, 474-Q, 671-Q, 891-Q, 967-Q, 968-Q, 980-Q
kinetics of, 229-J
low-temperature, 268-J

Tempering (cont.)
structure changes, 281-N
Tensile testing, 90-Q, 312-Q, 822-Q, 879-Q
electro-acoustic device, 462-Q
standardization, 858-Q
test bars, 134-Q, 242-Q
test rig, 382-Q
Tension, 426-Q, 739-Q, 970-Q
anisotropy, 330-Q, 414-Q
deformation, 284-Q, 817-Q
finite strain, 725-Q
localized necking, 50-Q, 85-Q
oblique necking, 732-Q
pressure effects, 448-Q
slip, 410-Q, 559-Q
stress distribution, 327-Q, 880-Q
Testing, 347-Q. See also specific test methods and under specific materials and products.
high temperature, 281-Q
low temperature, 276-Q
statistical analysis, 333-Q, 334-Q, 335-Q
Textile machinery, 547-E, 612-E
Thallium, 38-P, 1-V
in lead, 363-Q
self-diffusion, 306-N
superconductivity, 51-P
Thallium plating, 169-L
Thermal analysis, 169-M, 36-S
Thermal conductivity, 258-P, 423-P
low temperature, 64-P, 419-P
magnetic field effects, 419-P
measurement of, 220-P
Thermal expansion, 114-P, 482-P
measurement of, 442-P
Thermionic constants, 17-P, 70-P, 292-P, 327-P, 341-P. See also Work functions.
Thermit welding, 365-K, 388-K, 617-K, 630-K
Thermocouples, 61-S
calibration, 41-S
copper-constantan, 49-S
immersion type, 40-S, 72-S, 126-S, 298-S
installation and maintenance, 259-S
molybdenum-tungsten, 36-S
pile-irradiated, 224-S
protection tube, 404-S
rolled wires, 400-S
switches, 12-S
Thermodynamics and thermochemistry, 33-P, 162-P, 169-P, 309-P, 496-P
Thermoelectric properties, 64-M, 449-P
low temperature, 166-P, 494-P
Thermostats, 147-S
Thickness measurement, 131-S, 214-S, 245-S, 389-S. See also under Electroplate; Paint; Rolling Mills.
Thickness measurement (cont.)
electrical, 129-S
magnetic, 278-S
supersonic waves, 206-S, 263-S
x-ray, 138-S, 178-S, 304-S
Thorium, 88-B, 87-V
gas absorption, 40-H
photofission, 320-P
radiation from, 241-P
Thorium borides
structure, 256-M
Thorium oxides
thermionic emission, 292-P
Thorium selenides
structure, 281-M
Thread rolling, 90-G, 117-G, 150-G, 270-G, 296-G
Tin
allotropic transformations, 100-N, 253-N
dendritic growth, 36-M, 101-N, 262-N
determination, 47-S, 203-S
electric properties, 50-P
in steel, 282-F, 531-Q, 615-Q
isotopes, 153-P, 363-P
low temperature properties, 51-P, 253-P
recovery from tin plate, 97-A
screw dislocations, 103-M
single crystals, 328-M, 378-M, 39-N, 68-N, 876-Q
superconductivity, 51-P, 122-P, 253-P, 297-P
surface tension, 380-P
thermal conductivity, 146-P
Tin alloys, 291-T, 294-T, 45-V, 46-V
crystal structure, 428-M
fabrication, 166-G
fatigue, 648-Q
protective coatings, 127-L, 489-L
tensile testing, 290-Q
Tin-bismuth-antimony alloys, 375-M
Tin bronze, 380-E
melting, 528-E
microstructure, 83-M, 236-M
Tin cans, 37-A, 28-F, 60-F, 228-T
Tin coating (hot dip), 97-L, 389-L, 531-L, 634-L, 646-L, 688-L, 717-L. See also Tin plating.
Tin die castings, 560-E
Tin extraction and refining, 18-C, 176-C
Tin foil, 70-L
Tin foundry practice, 621-E
Tin industry, 84-A, 103-A
Great Britain, 172-A
Indonesia, 200-A
Tin-nickel plating. See Nickel-tin plating.

Tin ores
concentration, 17-B, 112-B
Tin-plate, 37-A, 60-L
annealing, 45-J, 262-J
crystal structure, 704-L
soldering, 268-L
thickness measurement, 214-S, 304-S
tin recovery, 97-A
welding, 561-K, 624-K
Tin-plate mills, 7-A, 38-F, 45-F, 240-F, 273-L, 447-L, 478-L
Tin plating, 31-L, 76-L, 374-L, 385-L, 455-L, 490-L, 497-L. See also Nickel-tin plating; Tin coating (hot dip); Tin-zinc plating.
bath analysis, 47-S
contact tinning, 585-L
economic survey, 84-A
fluoride bath, 168-L, 667-L
sulfate bath, 52-P
Tin-zinc plating, 142-L, 281-L, 374-L
Tin-zirconium alloys, 224-N, 173-N
Titanium
allotropic transformations, 167-N, 204-N
anodic polarization, 135-P
Australian research, 53-B
bibliography, 20-V
corrosion, 7-R, 21-R
creep, 174-Q, 479-Q
economic survey, 250-A
electric resistance, 355-P
electrolytic polishing, 34-M
film formation, 200-M
grain growth, 50-M, 30-N
hardness testing, 22-Q
historical review, 41-A
in steel, 183-B
isotopes, 234-P
lattice spacings, 70-M, 149-M
microstructure, 8-M, 77-M
neutron cross section, 324-P
oxidation, 14-R, 44-R, 147-R, 209-R
plastic deformation, 170-M, 167-Q, 624-Q, 895-Q
properties, 924-Q
recrystallization, 304-N, 98-Q
research, 236-A
reviews, 103-T, 7-V, 14-V, 37-V, 52-V, 67-V, 69-V, 75-V, 96-V, 103-V, 108-V
screw dislocations, 50-M
single crystals, 170-M, 319-M
specific heat, 399-P
stress-rupture, 6-Q
superconductivity, 103-P
superlattice formation, 427-P
vapor pressure, 310-P, 487-P
Titanium alloys, 123-T, 56-V, 62-V, 73-V, 76-V, 77-V, 95-V, 99-V
aging, 57-N
Air force program, 56-T
bonding, 96-K
brazing, 215-K, 221-K, 435-K, 549-K, 596-K, 674-K
case hardening, 206-J, 267-J
casting, 303-E, 366-E
cleaning, 177-L, 675-L
corrosion, 135-R, 198-R, 253-R, 269-R, 299-R, 340-R, 470-R
crystal structure, 11-M
descaling, 675-L
drawing, 65-G, 82-G
forging, 366-E, 21-F, 104-F, 159-F, 175-F, 268-F, 269-F, 491-Q
friction, 135-Q, 136-Q
grinding, 164-G, 316-G
heat stability, 793-Q, 1008-Q
heat treatment, 81-J, 227-J, 267-J, 908-Q
inspection, 218-S
low temperature behavior, 888-Q
machining, 107-G, 121-G, 130-G, 165-G, 221-G, 327-G
Navy program, 57-T
nitriding, 58-J, 226-J
ordnance uses, 28-V
polishing, 418-M
powder metal processing, 10-H
properties, 168-Q
protective coatings, 267-J, 224-L, 66-N
rolling, 392-M, 896-Q, 58-T
soldering, 549-K, 674-K
spinning, 105-G
stamping, 273-G, 307-T
stretch-forming, 26-V
surface contamination, 470-L
tapping, 193-G
vapor-deposited coatings, 224-L, 66-N
welding, 200-J, 170-K, 213-K, 422-K
welding, arc, 424-K, 657-K
welding, spot, 257-K
working, 82-F, 192-F, 93-G, 232-G, 260-G, 379-G, 190-T
Titanium-aluminum alloys, 13-H, 53-J, 69-M, 80-N, 274-N, 275-N, 168-Q
Titanium borides, 27-H
Titanium carbides, 131-G, 102-H, 51-V
phase diagram, 79-M
production, 97-H
properties, 314-P, 471-Q
triple carbides, 423-M
Titanium-chromium alloys, 73-J, 62-M, 71-M, 353-M, 80-N, 275-N

Titanium-copper alloys, 62-M
Titanium extraction and refining, 16-C, 26-C, 28-C, 29-C, 35-C, 69-C, 106-C, 79-V, 101-V
bibliography, 308-A
smelting, arc furnace, 53-C, 67-C, 131-C, 141-C, 158-C
Titanium foundry practice, 43-E, 197-E
Titanium industry,
production statistics, 177-A
Titanium-iron-vanadium alloys, 282-N
Titanium-manganese alloys, 75-M, 351-M, 385-M, 129-N
Titanium-molybdenum alloys, 274-N, 960-Q 1030-Q
Titanium-nickel alloys, 78-M, 346-M
Titanium ores
flotation, 170-B, 177-B
Titanium plating, 206-J
Titanium-silver alloys, 173-M
Titanium-tantalum alloys, 76-M, 352-M
Titanium-tin alloys, 250-M
Titanium-tungsten alloys, 76-M
Titanium-uranium alloys, 251-M
Tolerances. See Specifications.
Tools, 190-A, 221-A, 3-G. See also Carbide tools; Cutting tools; Toolsteel; and specific tools and processes, e.g., Turning.
abrasive blasting, 84-L
cast, 345-E
grinding, 119-G
low temperature failure, 1-T
welding repair, 335-K
Toolsteel, 171-G, 102-Q, 85-T, 348-T, 55-V, 126-V, 127-V
austenite decomposition, 6-N, 300-N
carbides in, 68-M
casting, 114-E
directory of brands, 23-A
extrusion, 194-T
grain growth, 284-N, 285-N
grinding, 397-G
heat treatment, 22-J, 117-J, 162-J, 188-J, 233-J
machinability, 284-G
magnetic properties, 153-J
martensite reaction, 6-N
precipitation in, 211-N
prestressing and peening, 783-Q
production in openhearth, 234-D
quality control, 64-S, 137-S
quench hardening, 64-J, 248-J, 257-J, 6-N
spark testing, 71-S
standards, 300-S
tempering, 153-J
testing, 845-Q
Toolsteel (cont.)
wear, 60-G, 324-G, 243-Q, 433-Q
welding, 79-K, 256-K
Torsion, 699-Q, 1021-Q
bars and rods, 421-Q, 556-Q, 564-Q
columns, 717-Q
cylinders, 563-Q, 631-Q, 714-Q
shafts, 670-Q, 688-Q, 689-Q
tubes, 700-Q, 701-Q
Tower, Charlemagne, 47-B
Toys, production, 35-G, 121-H
Trailers, 601-Q
Transistors
aluminum-antimony, 185-T
germanium, 411-P, 469-P, 115-T
silicon, 281-P, 264-T
Transition metals
gas absorption, 452-P
neutron diffraction, 151-M
sigma-phase formation, 59-M
strength, 239-N
structure, 101-M, 309-M, 361-M
thermionic constants, 70-P
valency, 360-M
Tschernoff, D. K., 117-A
Tubes, 63-F, 191-F, 226-F, 384-G, 51-K
bending, 23-G, 111-G, 116-G, 181-G, 388-G
corrosion, 385-R
grinding, 71-G
inspection, 267-S
normalizing, 189-J
piercing, 26-F
plastic deformation, 324-Q
plasticity, 95-Q, 737-Q
pressure testing, 102-S
roll forming, 70-G
rolling, 78-F
strength, 786-Q
welding, 55-F, 474-K, 508-K, 590-K, 610-K, 675-K
Tubes, aluminum, 267-F, 226-T, 255-T, 347-T
collapsible, 50-T, 79-T
plasticity, 606-Q
Tubes, brass, 68-R
Tubes, copper, 257-F, 196-T, 318-T
Tubes, seamless, 112-D, 229-F, 241-F, 272-F, 233-G
Tubes, stainless steel, 335-T
descaling, 230-L
extrusion, 122-F, 127-F
welding, 609-K
Tubes, steel, 62-S, 326-S, 153-T
centrifugal casting, 93-F
drawing, 7-F
electrostatic spraying, 216-L

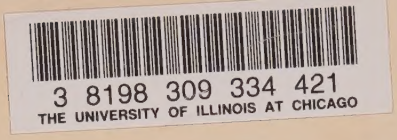
Tubes, steel (cont.)
extrusion, 98-F
inspection, supersonic, 53-S
welding, 82-K, 276-K, 277-K, 305-K
butt, 338-Q, 339-Q, 340-Q, 341-Q, 343-Q, 397-Q, 398-Q
Tumbling, 223-L, 259-L, 415-L, 492-L, 602-L. See also Barrel plating.
abrasives, 355-L, 417-L
steel balls, 514-L
time charts, 681-L
Tungsten, 156-A, 364-T, 68-V, 78-V
diffusion in steel, 52-M
gas dissociation on, 54-N
grain growth, 9-N
heat resistance, 41-H
plastic deformation, 127-M, 162-Q
specific heat, 479-P
thermionic emission, 82-P
work functions, 224-P
working, cold, 127-M, 162-Q
Tungsten alloys
arc welding electrodes, 183-K
high density, 351-Q
Tungsten carbide coatings,
flame plating, 24-L, 33-L, 95-L, 116-L, 158-L, 164-L, 200-L, 300-L
Tungsten carbides, 79-H, 58-V, 121-T
crystal structure, 132-M
electroplating, 360-L
in bearings, 343-T
in shells (ordnance) 36-H, 56-H
microstructure, 192-M
pulverizing hammers, 5-B
weld-deposited coatings, 33-L
Tungsten industry, 8-A, 183-A, 210-A
Tungsten ores
concentration, 58-B
flotation, 17-B
secondary enrichment, 62-B
Tungsten oxides, 391-P
Tungsten powders, 14-H, 21-H, 36-H, 56-H
Tungsten steel, 159-M
Turbines, 422-E, 6-F, 322-K, 403-K, 154-T
See also Gas turbines; Marine turbines.
Turning (machining), 6-G, 28-G, 74-G, 147-G, 398-G
Ultrasonic waves. See Supersonic waves.
Ultra-violet rays
radiation damage, 201-A
Uranium, 103-T
allotropic transformation, 71-N
chemical bonding, 36-P
crystal structure, 17-M, 350-M
elastic hysteresis, 562-Q
etching, 351-M
Uranium (cont.)
gamma ray transmission, 222-S
-graphite lattice, 111-M
-hydrogen system, 57-M
meson interaction, 86-N
neutron absorption, 212-P
oxidation, 92-P
polygonization, 366-M
properties, 274-T
radiation from, 241-P
rolling, 150-F
single crystals, growth, 109-N
slip, 286-Q
thermoelectric properties, 475-P
twinning, 286-Q, 287-Q
Uranium extraction and refining, 12-B, 2-V
Uranium industry
world production, 235-A
Uranium ores
Canada, 192-A
leaching, 232-B
South Africa, 103-B
Uranium borides
structure, 256-M
Uranium oxides
electrodeposition, 546-L
thermal conductivity, 126-H
Uranium-titanium alloys, 251-M
Uranium-vanadium alloys, 147-M
Vacuum equipment
corrosion, 98-R
plant applications, 29-R, 219-R
testing by, 23-S
Vacuum refining, 17-C, 117-C, 148-C, 151-C, 168-C, 171-C, 649-E
effect on metal properties, 59-C, 174-C, 249-D
furnace design and performance, 95-C 160-C, 164-C, 166-C, 297-S
stability of compounds, 234-N
Valency, 34-P
Valves
surface stresses, 705-Q
Valves, nickel, 127-T
Valves, steel, 129-G, 119-T
heat treatment, 119-J
Vanadium
energy levels, 46-P
properties, 68-V
-uranium system, 147-M
Vanadium alloys, 389-M, 55-P
Vanadium-cobalt-iron alloys, 175-Q
Vanadium industry, 183-A
Vanadium oxides, 74-M
corrosive action, 208-R
structure, 298-N
Vanadium

Vanadium extraction and refining, 89-C, 129-C, 53-D
Vanadium-titanium-iron alloys, 421-E
Vapor-deposited coatings, 94-L, 224-L, 346-L, 406-L, 448-L, 698-L, 66-N
cathode sputtering, 522-L
condensation temperatures, 270-N
epitaxial deposits, 202-N
vacuum evaporation, 14-L, 26-L, 288-L, 427-L, 561-L, 590-L, 617-L, 642-L
Vapor pressure
metals to 2000° C., 260-P
Wages, incentives, 73-A, 161-A
Waste treatment, 27-A, 54-A, 96-A, 112-A, 124-A. See also Electroplating; Pickling waste treatment.
Water heaters
corrosion, 466-R
finishing, 571-L
Water meters
corrosion, 479-R
Water tanks, 202-T
cathodic protection, 3-R, 278-R
galvanized, corrosion, 73-R
galvanized, defects, 296-S
painting, 332-L
Water treatment, 96-A, 480-L, 18-R, 161-R, 197-R, 307-R, 429-R
instrumentation, 140-S
Wear, 219-Q, 756-Q. See also Abrasion; Friction and under specific metals and products, e.g., Bearings, wear.
electron microscope study, 184-Q, 457-Q
fretting, 567-Q
relation to hardness, 919-Q
tests, 358-Q, 433-Q, 778-Q
theory of, 352-Q, 824-Q
Weighing equipment, 227-S
Weld-deposited coatings, 138-L, 267-L, 358-L, 382-L, 564-L, 580-L. See also Tungsten carbide coatings.
earthmoving equipment, 429-L
equipment for, 337-L, 379-L
fluxes, 726-L
hammers, 302-L
plungers, 171-L
stresses in, 245-K
tools, 689-K, 481-L
turning, 399-G
welding, 105-L
Weldability, 123-K, 249-K, 298-K, 686-K
tests, 331-K, 634-K
Welding, 9-K, 26-K, 157-K, 274-K, 436-K, 449-K, 520-K, 524-K, 589-K. See also Brazing; specific welding processes, e.g., Arc welding; and under specific metals and products, e.g., Steel, welding.
Welding (cont.)
Belgian practice, 512-K
books, 58-K, 59-K, 247-K, 452-K, 454-K, 705-K
construction methods, 210-K
costs, 180-K, 521-K
design for, 66-E, 71-K, 448-K, 452-K, 503-K, 640-K, 705-K
distortion control, 168-K, 279-K, 410-K, 481-K, 640-K
electrical uses, 11-K, 97-K
fixtures, 167-K, 349-K, 412-K, 476-K, 558-K
fluxes, 300-K
French practice, 189-K
German practice, 151-K
heat in, 141-K, 166-K
literature review, 177-K
marine uses, 138-K, 243-K
metallurgy of, 522-K, 706-K
methods classed, 395-K
power supply, 571-K
research, 134-K, 447-K, 644-K, 673-K
Russian practice, 13-K, 321-K, 547-K
safety, 234-K
selection of method, 477-K
shop hints, 148-K, 337-K, 432-K, 463-K
standards, 707-K
training courses, 100-K, 159-K, 161-K
wedge welding, 132-K
welding review, yearbook, 453-K
Welding industry, growth of, 45-K
Welding machines, 8-K, 86-K, 325-K, 472-K, 661-K, 665-K
Welding repair, 6-K, 371-K, 376-K, 557-K
Welding shops, 106-K, 439-K, 599-K, 611-K, 690-K
Welds
annealing, 222-J, 256-J
chipping, 84-F
corrosion, 356-R
cracking, 125-K, 511-K, 685-K, 612-Q, 772-Q
creep, 518-K
defects, 142-K, 398-K, 582-K, 660-K
discoloration, 124-L
embrittlement, 186-Q
fatigue, 633-K, 187-Q, 338-Q, 339-Q, 340-Q, 341-Q, 360-Q, 993-Q
gas content, 200-K, 244-K
impact strength, 408-K, 622-K, 271-Q, 683-Q
inspection, 98-K, 37-S, 211-S, 309-S, 368-S, 386-S, 391-S
load capacity, 991-Q
low temperature behavior, 357-K
magnetic particle inspection, 15-S, 340-S

Welds (cont.)
mechanical properties, 587-K
nondestructive tests, 380-S
porosity, 656-K
recrystallization, 342-K
residual stess in, 578-K
segregation in, 216-K
strength, 379-Q
stress relief heat treatment, 224-J, 244-J, 254-J, 128-K, 653-K, 340-Q, 343-Q
stresses in, 512-Q
supersonic inspection, 74-S, 189-S, 226-S, 313-S
tests, 201-K, 539-K
torsion test, 1028-Q
x-ray inspection, 372-K, 430-K, 8-S, 127-S, 150-S, 221-S, 289-S, 392-S
Wetting agents. See Surface active agents.
Wheels
forging, 23-F, 24-F, 48-F, 56-F, 66-F
rolling, 56-F
welding repair, 65-K
Wire, 168-F. See also Wire rope.
coating thickness, 131-S
connections, 98-H, 564-K
descaling, 119-L
electric resistance, 293-P
enameling, 562-L
fatigue testing, 907-Q
gauge tables, 104-S
heat treatment, 203-J, 217-J, 218-J
inspection, 403-S
packaging, 300-R
pickling, 264-L
scaling, 78-R
specifications, 344-S
stiffness, 934-Q
welding, 406-K
Wire, aluminum, 98-H
Wire, brass, 2-F
Wire, copper, 2-F, 261-F
brass-coated, 166-F
connections, 98-H
defects, 35-F
drawing, 94-F
structure, 503-Q
Wire drawing, 133-F, 199-F, 259-F, 644-L
coiling and spooling, 106-F, 107-F
dies, 157-F, 201-F, 283-S, 361-S
drawing compounds, 3-F, 263-F
protective coatings, 4-F, 252-F
safe practice, 126-A
stress distribution, 133-F, 328-Q
Wire drawing machines, 92-F, 215-F
Wire, galvanized, 692-L
Wire industry, 92-A
Wire, molybdenum, 362-T
Wire rope, 26-Q, 197-Q, 429-Q
Wire, silver, 32-F, 182-F
Wire, stainless steel, 238-J, 44-P, 343-S, 39-T
Wire, steel, 145-F, 260-F
copper-plated, 85-F, 589-L
drawing, 75-F, 262-F
heat treatment, 191-J
in reinforced concrete, 49-T, 248-T
patenting, 11-J, 69-J, 179-J
Wire, tungsten, 122-T, 362-T
Work functions, 224-P, 294-P, 298-P, 327-P, 431-R
Working (metal), 134-F, 87-G, 120-G. See also specific working processes, e.g., Rolling; and under specific metals and materials, e.g., Steel, working.
effect on corrosion, 64-R
effect on electric resistance, 5-P, 293-P
effect on emissivity, 60-P
effect on mechanical properties, 132-Q
energy storage in, 163-P, 420-P
lubricants for, 44-G
models, 129-F
phase changes in, 132-Q
recovery, 119-N, 750-Q
work hardening, 198-G, 495-P, 24-Q, 36-Q, 159-Q, 821-Q, 1033-Q
x-ray studies, 242-M, 368-M, 162-Q
Working (metal) industry, 22-A, 29-A, 30-A
Wrenches, 595-Q
Wrought metal, 883-Q. See also specific metals, e.g., Aluminum alloys, wrought.
Xenon isotopes, 362-P
X-ray analysis, 201-S
X-ray diffraction, 160-M, 211-M, 270-M, 362-M, 376-M. See also Crystals.
ASTM index, 435-M
books, 55-M, 202-M, 206-M
design of equipment, 263-M
fogging, 213-M
intensity measurement, 107-M
line breadths, measurement, 109-M, 127-M, 196-M
low symmetry crystals, 258-M
monochromator, 16-M
polarization, 260-M, 296-M
powder patterns, 383-M, 435-M
scattering, 135-M, 242-M, 271-M, 297-M, 434-M
single crystal studies, 266-M
soller slit, 198-M
surface studies, 254-M
texture mapping, 123-M
X-ray microscopy, 199-M, 268-M

Ytterbium, 81-C
Yttrium, 235-P, 386-P
Yugoslavia
  mineral industry, 26-A
Zinc, 68-A
  diffusion in brass, 7-N
  diffusion, self, 308-N
  electrode potential, 393-P
  Hall effect, 45-P
  isotopes, 265-P, 289-P
  lattice distortion, 305-M
  plastic deformation, 65-Q, 318-Q, 751-Q
  reaction with bromides, 283-P
  recrystallization, 110-N, 164-N, 672-Q
  rheotropy, 69-Q
  single crystals,
    abrasion, 298-P
    adsorption on, 108-P
    cleavage, 854-Q
    creep, 299-Q, 558-Q, 899-Q
    growth of, 14-N, 124-N
    plastic deformation, 97-Q, 897-Q
    recovery, 256-N
    shear, 897-Q, 899-Q
    strain, 79-Q
    twinning, 55-Q, 1034-Q
    yield stress, 898-Q
  twinning, 306-M
  vapor pressure, 94-C
  work function, 298-P
Zinc alloys, 287-T
  analysis, 132-S
  anodes for cathodic protection, 384-R
  corrosion, 225-R
  degreasing, 632-L
  drawing, 48-G
  dyeing, 457-L
  electric resistance, 85-P
  in press tools, 252-T
  protective coatings, 127-L, 203-L
  sampling, 95-S
  spinning, 48-G
  thermodynamics, 37-P
  wrought, 8-V, 48-V
Zinc-aluminum alloys
  corrosion, 121-R
  segregation, 408-M
  transformation, 122-N
Zinc-bismuth alloys, 37-P
Zinc coatings, 526-L. See also Galvanizing; Zinc plating.
  analysis, 371-R
  bending, 526-Q
  corrosion resistance, 378-L, 425-L
  failure, 389-L
  strip test, 452-L, 692-L
Zinc die casting practice, 81-E, 388-E, 395-E
  automatic pressure die, 44-E
  dies, 53-E
  melting, 191-E, 365-E
Zinc die castings, 153-E, 337-E, 342-E, 505-E, 558-E, 631-E
  cleaning, 638-L
  cost, 407-E, 496-E
  electroplating on, 352-L
  polishing, 354-L, 572-L
  porosity, 81-E, 700-L
  properties, 126-Q
  tolerances, 403-E
Zinc extraction and refining, 66-C, 143-C
  distillation, 25-C, 164-C
  electrolytic methods, 41-C, 58-C, 139-C
  ingot casting, 50-C
  recovery from slag, 93-C
  reduction by metals, 94-C
  sampling, 86-A
  smelting, 13-C, 24-C, 55-C, 123-C
    blast furnace, 8-C
    electric arc, 51-C
Zinc foundry practice, 324-E
Zinc-indium alloys, 219-P
Zinc industry
  economic decline, 153-A
  Europe, 142-A, 278-A
  production and forecasts, 79-A, 143-A, 166-A, 174-A, 232-A, 279-A, 280-A, 113-V
Zinc-lead alloys, 37-P
Zinc ores
  beneficiation, 46-B
  flotation, 197-B
  leaching, 191-B
  roasting, 115-B, 212-B, 227-B
Zinc oxides, 92-M
Zinc plating, 225-L, 279-L, 422-L, 529-L. See also Galvanizing; Tin-zinc plating.
  barrel plating, 163-L, 407-L
  bath impurities, 247-L
  cyanide bath, 213-L
  displacement method, 395-L
  embrittlement, 384-L
  strip test, 452-L, 692-L
  "tear" formation, 519-L
Zirconium
  -chromium system, 61-N
  -copper system, 72-M, 73-M
  electrolytic polishing, 34-M
  embrittlement, 523-Q, 963-Q, 159-R
  foundry uses, 179-E
  gettering action, 247-T
  grain-refiner in magnesium, 451-Q

Zirconium (cont.)
hardness, 81-M
in nuclear power plants, 116-C, 156-T, 176-T, 213-T, 314-T
isotopes
decay, 363-P
disintegration, 213-P
nuclear levels, 321-P
photoneutron cross-section, 175-P
in steel, 183-B
nitrogen diffusion in, 75-N
orientation of rolled, 169-Q, 535-Q
recovery, 172-N
review, 159-N, 103-T, 11-V, 17-V, 18-V, 36-V, 67-V, 70-V, 108-V, 114-V
transformations, 174-N
Zirconium alloys, 44-M, 223-M, 225-M, 80-V
analysis, 240-S
brazing, 289-K
corrosion, 198-R, 270-R, 340-R, 408-R
electroplating on, 340-L
fabrication, 163-F
heat treatment, 523-Q
metallography, 222-M
soldering, 289-K
Zirconium borides, 27-H
Zirconium carbide
sintering, 116-H
Zirconium chloride
heat of formation, 77-P
Zirconium-chromium alloys, 61-N
Zirconium extraction and refining, 13-B, 33-C, 63-C
halide decomposition, 43-C, 103-C, 104-C, 152-C
hydride decomposition, 118-C
parting, 68-C
reduction by mercury, 105-C
smelting, arc furnace, 56-C, 141-C
vacuum refining, 17-C
Zirconium foundry practice, 43-E
Zirconium-manganese alloys, 225-M
Zirconium ores
concentration, 133-B
Zirconium oxides, 332-P, 333-P
Zirconium oxide refractories, 1-B
Zirconium powders, 23-H
combustion, 38-H
sintering, 86-H
Zirconium silicate, 379-E
Zirconium-silicon alloys, 223-M, 412-M
Zirconium-silver alloys, 121-M
Zirconium-tin alloys, 224-M, 173-N


3 8198 309 334 421
THE UNIVERSITY OF ILLINOIS AT CHICAGO

THIS BOOK IS FOR USE
ONLY IN THE LIBRARY
IT DOES NOT CIRCULATE